

The Queensland Naturalist

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— and its Branches. —

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No. I.

PROCEEDINGS.

JANUARY, 1914—APRIL, 1915.

ANNUAL MEETING, 29th JANUARY, 1914.

Present : H. A. Longman (in the chair), and 22 members.

Annual Report : The report of the Committee for 1913 was read and adopted.

Presidential Address : The retiring President delivered an address on "Some Modern Theories of Evolution" (vide Transactions, p. 8).

Office Bearers : The election of office-bearers for 1914 resulted as follows:—*President*, F. Burt ; *Vice-President* : Miss Freda Bage, M.Sc. ; *Committee* : Miss M. Garraway, Miss K. Sheldon, H. A. Longman, W. R. Colledge, C. D. Gillies, B.Sc., and Prof. S. B. J. Skertchly ; *Hon. Lanternist*, W. M. Tanner ; *Hon. Librarian*, Miss E. N. Parker ; *Hon. Excursion Secretary*, R. Higgins ; *Hon. Secretary and Treasurer*, C. T. White.

The retiring President announced that the Committee had decided to elect as Honorary members of the Club a number of scientists who had advanced the knowledge of Natural History in Queensland, and proposed the following names:—F. Manson Bailey, C.M.G., F.L.S., C. W. De Vis, M.A., W. R. Colledge, S. B. J. Skertchly, J. Douglas Ogilby, A. J. Turner, M.D., F.E.S., J. Shirley, D.Sc. ; seconded by Mr. R. Higgins and carried.

EVENING MEETING, 26th FEBRUARY, 1914.

Present : F. Burt (in the chair), and 20 members.

Members elected : F. Eastwood, —, Sheldon.

Papers : By Dr. F. Hamilton Kenny, on "The Birds of Gayndah" (vide Transactions, p. 16). By Mr. C. D. Gillies on "The Parasites of Birds," illustrated by a number of specimens.

Exhibits : By Miss E. N. Parker—a luminous fungus (*Hiatula Wynniae*). By R. Higgins—Kestrel eggs from Western Queensland, and specimen of a bird's nest from Goodna scrub.

EVENING MEETING, 27th MARCH, 1914.

Present : F. Burt (in the chair), and 30 members.

Member elected : H. Haynes.

Reports : A report on the botany of the excursion to Enoggera Reserve was given by Mr. C. T. White. Mr. W. R. Colledge gave reports, illustrated by lantern slides, on the pond-life of the excursions to Ithaca Creek and Enoggera Reservoir, and in the latter locality a fair quantity of *Volvox globator* was seen, and a number of rotifers collected.

Exhibits : By H. A. Longman—Aquatic plants from Enoggera Reservoir, a few botanical specimens from Toowoomba, and a growing plant of *Dendrobium Mortii*. By F. Burt—Ferns from Manly and Enoggera.

EVENING MEETING, 1st MAY, 1914.

Present : F. Burt (in the chair), and 34 members.

The President, on behalf of the Club, extended a cordial welcome to Mr. Gregory M. Matthews on his visit to Brisbane.

Lecturette : Mr. Matthews delivered a short interesting address, touching especially on the wanton destruction of bird life in Australia, and hoped that the Australian Governments would take up the matter of the preservation of our native birds in earnest.

Reports : A report on the botany of the excursion to Bribie Island (Easter) was given by Mr. C. T. White, who showed in illustration thereof a number of lantern slides, and also a collection of mounted specimens. A report on pond-life by Mr. W. R. Colledge was held over for the next meeting.

Exhibits : By J. R. Sankey—A collection of shells from Keppel Bay, and a fine specimen of pearl shell from Torres Straits. By F. Burt—A collection of ferns from Bribie Island. By R. Higgins—Shells from Bribie Island, and a number of botanical specimens from the Blue Mountains, N.S.W. By Mr. Wheeler—Various specimens from Caloundra, also photographic views of Caloundra.

EVENING MEETING, 29th MAY, 1914.

Present: F. Burt (in the chair), and 50 members.

The President, on behalf of the Club, welcomed back to Brisbane Messrs. Tryon, Johnston and Holland, who about eighteen months previously had been appointed by the Queensland Government as a travelling commission to inquire into the possible methods of eradication or utilisation of the prickly pear.

The meeting was devoted to the display of specimens under the microscope, and took the form of a conversazione. Specimens were shown by Miss Freda Bage, M.Sc., Dr. T. Harvey Johnston, and Messrs. W. R. Colledge, W. M. Tanner, E. M. Shearwin, E. Jarvis, and C. D. Gillies, B.Sc.

A set (2 vols.) of Leeuwenhoek's original papers, printed in 1718, was exhibited by Mr. H. Tryon.

EVENING MEETING, 26th JUNE, 1914.

Present: F. Burt (in the chair), and 25 members.

Prof. S. B. J. Skertchly gave a report—as representative of the Club—of the inaugural meeting of the Gould League of Bird Lovers in Queensland.

Mr. Tryon also spoke, and referred to the need of revision of the list of birds scheduled under the *Native Birds Protection Act*.

Prof. S. B. J. Skertchly moved, and Mr. R. L. Higgins seconded, that “a sub-committee consisting of Dr. F. Hamilton Kenny, Mr. H. Tryon and Mr. J. E. Young, should be formed for the purpose of revising the list.” Dr. Kenny proposed that the sub-committee report to the Club.

Lecturette: Prof. S. B. J. Skertchly gave a short account on some of his more recent geological work in the Nerang district.

Exhibits: By W. R. Colledge—A number of lantern slides illustrating some of the more interesting pond-life specimens gathered in recent excursions. By R. L. Higgins—A number of miscellaneous specimens gathered at Noosa by Miss E. N. Parker.

EVENING MEETING, 31st JULY, 1914.

Present: R. Higgins (in the chair) and 19 members.

Members elected: Miss H. Cleminson, B.Sc., Miss Phipps.

Report: Mr. W. R. Colledge gave a report on the pond-life of the excursion to Darra, illustrated with lantern slides.

Lecturette: Dr. Butler Wood delivered an interesting address, “Something About Teeth.”

Exhibit: By C. T. White—Specimens of the Rice Paper plant of China (*Fatsia papyrifera*) naturalised in some places round about Brisbane.

ANNUAL BOTANICAL MEETING, 22nd AUGUST, 1914.

Present : F. Burt (in the chair), and 35 members.

Mr. W. R. Colledge showed an interesting set of lantern slides, mainly of microscopic plant life, and made a few interesting remarks on each specimen.

Mr. C. T. White showed a series of lantern slides, representing trees of the Brisbane district, mostly from photographs taken on the outings of the Club.

The main contributors to the general exhibit of wild flowers and miscellaneous botanical specimens were:—Miss Maggie Palmer—Wild flowers from Moreton Island. Miss K. Sheldon—Plants from Kedron Brook. Mr. J. F. Bailey—Wild flowers from Mount Gravatt. Mr. F. Burt—Specimens of Queensland ferns. Mr. G. H. Barker—Wild flowers. Messrs. Longman and Illidge—Queensland orchids. Mr. C. T. White—Wild flowers from Sunnybank, and miscellaneous botanical specimens.

EVENING MEETING, 2nd OCTOBER, 1914.

Present : F. Burt (in the chair), and 12 members.

Mr. H. Tryon referred to the death of Mr. R. H. Relton, and spoke in eulogistic terms of the deceased gentleman, who at one time had taken an active interest in natural history matters in Queensland.

Paper : Mr. H. A. Longman exhibited specimens of the young of the Groper (*Epinephelus lanceolatus*), and communicated a short note thereon by Mr. J. Douglas Ogilby.

Exhibits : By H. A. Longman—Living specimens of the Gecko lizard (*Edura robusta*) and the Skink lizard (*Hemispheriodon gerrardii*). By Freda Bage, M.Sc.—Seed of the African Luckv Bean (*Afzelia africana*), the scarlet and black seeds of which are often used for ornamental purposes; A specimen of the hard bony shell of a South American Armadillo made into a work-basket. By J. E. Young—Ferns from Broadwater; miscellaneous botanical specimens from the Brisbane River. By H. Tryon—A number of miscellaneous botanical specimens from Broadwater, especial attention being drawn to the number showing bimorphic foliage. By C. W. Holland—A terrestrial Hermit Crab and its dwelling, from Gaudeloupe, West Indies; a specimen of the King Crab (*Limulus sp.*) from Florida, U.S.A. By C. T. White—Various native plants flowering at the Brisbane Botanic Gardens.

EVENING MEETING, 30th OCTOBER, 1914.

Present: F. Burt (in the chair), and 23 members.

Prof. S. B. J. Skertchly referred to the deaths of the eminent geologists Jukes Brown and Rev. Osmund Fisher.

Reports: Mr. H. A. Longman gave a report on the botany of the Enoggera excursion. Mr. W. R. Colledge gave a report on the pond-life of the Enoggera excursion, and screened a number of lantern slides in illustration.

Paper: Prof. S. B. J. Skertchly read a few notes on the "Bunyip." An interesting discussion followed.

Exhibits: By H. A. Longman—Living specimens of the Slow Worm (*Pygopus lepidopus*), and the Ring Snake or "Bandy Bandy" (*Furina occipitalis*). By C. T. White—Specimen of native plants flowering in the Brisbane Botanic Gardens.

EVENING MEETING, 4th DECEMBER, 1914.

Present: F. Burt (in the chair), and 23 members.

Report: By C. T. White—On the botany of the excursion to Enoggera Creek.

Paper: By R. Illidge—"Notes on a visit to South-Western Western Australia" (vide Transactions, p. 24).

Exhibits: By J. E. Young—Botanical specimens from the Brisbane River. By Miss E. N. Parker—A pod of the so-called "Cascara Bean" (*Cassia fistula*). By H. A. Longman—A few flowering sprays of the N.S.W. Christmas Bush (*Ceratopetalum gummiferum*) grown in a Brisbane garden; a specimen of one of the leaf-cutting bees (*Megachile sp.*) By E. M. Shearwin—Miscellaneous specimens from Stradbroke Island.

ANNUAL MEETING, 12th FEBRUARY, 1915.

Present: F. Burt (in the chair), and 27 members.

Annual Report: The report of the Committee for 1914 was read and adopted.

Presidential Address: The retiring President delivered an address on Fern Collecting (vide Transactions, p. 30.)

Office Bearers: The election of office-bearers resulted as follows:—*President*, Miss Freda Bage, M.Sc.; *Vice-President*: Dr. T. Harvey Johnston, M.A., F.L.S.; *Committee*: Mrs. Pattinson, Mr. C. D. Gillies, B.Sc., Mr. R. Illidge, Mr. H. A. Longman, Mr. E. H. Shearwin, Prof. S. B. J. Skertchly; *Hon. Lanternist*, Mr. W. M. Tanner; *Hon. Librarian*, Miss E. N. Parker; *Hon. Excursion Secretary*, Mr. W. R. Colledge; *Hon. Secretary*, Mr. C. T. White. Later Mr. F. Burt was appointed Hon. Treasurer.

Paper: A paper, "Christmas Day in New Ireland, by Dr. F. Hamilton Kenny, was communicated by Mr. H. A. Longman.

EVENING MEETING, 25th FEBRUARY, 1915.

Present: Miss F. Bage, M.Sc. (in the chair), and 17 members.

Reports: On excursion to Kedron Brook (*a*) Pond-life, by W. R. Colledge; (*b*) Botany, by C. T. White.

Lecturette: Mr. A. B. Walkom, B.Sc., gave a general talk on Palaeobotany, and showed a number of specimens of fossil plants, the majority of them being from Kedron Brook (Nundah).

Exhibits: By Miss E. N. Parker—Jaws of a shark. By W. R. Colledge—A specimen of the Pineapple Fish (*Chilomycterus grandoculis*) collected at Caloundra. By H. A. Longman—Part of the skull of a young dugong picked up on the beach at Bribie Island. By J. Douglas Ogilby—Specimen of a fish (*Mionurus gillii*) Percelle (communicated by H. A. Longman).

EVENING MEETING, 25th MARCH, 1915.

Present: Miss F. Bage, M.Sc. (in the chair), and 25 members.

Paper: By R. Illidge—"Beetle collecting in West Australia."

Reports: On the excursion to Enoggera (*a*) Pond-life, by W. R. Colledge; (*b*) Entomology, by H. Tryon; (*c*) Botany, by C. T. White.

EVENING MEETING, 29th APRIL, 1915.

Present: Miss F. Bage, M.Sc. (in the chair), and 35 members.

Reports: On the excursion to Bribie Island (*a*) Marine and fresh-water life, by Dr. T. Harvey Johnston, M.A.; (*b*) Entomology, by H. Tryon; (*c*) Botany, by C. T. White. A brief discussion followed on the reports. Mr. H. Tryon referred to the wealth of bird life on Bribie Island, and moved that,—"The Field Naturalists' Club make representation to the Government to have Bribie Island declared as a bird sanctuary," seconded by Mr. H. A. Longman, and carried.

Exhibits: By J. R. Sankey—Shells from Northern N.S.W. By R. Illidge—Living plants of *Dendrobium cucumerinum*, Cucumber Orchid from the Kilcoy district. By H. A. Longman—A giant Planarian from the Bunya Mountains. By J. Douglas Ogilby—Specimens of and notes on the silver

sprat (*Hyperlophus copii*), vide Transactions, p. 30, (communicated by H. A. Longman).

Mr. H. A. Longman referred to the death of Mr. A. Alder, and spoke in eulogistic terms of his work as taxidermist to the Brisbane Museum, and moved that a letter of sympathy be sent to the widow.

On behalf of the members, the President presented to the Hon. Secretary a pocket-book containing a substantial monetary recognition of that gentleman's work on behalf of the Club.

EVENING MEETING, 27th MAY, 1915.

Present : H. A. Longman (in the chair), and 30 members.

The chairman referred to the loss at the Dardanelles of Capt. Bage and Lieut. Skertchly, and a resolution was passed that letters of sympathy be sent to the President and Prof. Skertchly respectively.

Reference was also made to the death of the veteran Queensland scientist, Mr. C. W. De Vis.

Reports : On Tamborine Mountain excursion (a) General, by Dr. J. Shirley ; (b) Botany, by C. T. White (vide Transactions, p. 37).

Exhibits : By W. R. Colledge—Lantern slides of Tamborine Mountain. By J. Shirley, D.Sc.—Shells from Bribie Island. By R. Higgins—Shells from Keppel Bay, and copper ore and copper in the finished stage, from Mt. Morgan. By C. T. White—*Pandanus monticola* and *Tapeinocheilos pungens* var. *Queenslandiae*, received by Dr. Shirley from the Johnstone River.

EVENING MEETING, 24th JUNE, 1915.

Chairman : Dr. T. Harvey Johnston.

Report : A report on the pond-life of the recent excursion to Gold Creek was given by Mr. W. R. Colledge.

Exhibits : By Dr. T. Harvey Johnston—A number of specimens of marine life, collected at Keppel Bay by Lieut. R. Higgins. By H. A. Longman—A live specimen of the Leaf-tail Gecko (*Phyllurus platurus*) from Tamborine Mountain ; specimens of Palolo worms from Polynesia. Mrs. Pattinson—Conchological specimens (demonstrated by J. R. Sankey).

On behalf of the members, the chairman then presented Mrs. Pattinson with several mementoes in recognition of her kindness on the occasion of the Club's visit to Tamborine Mountain.

TRANSACTIONS.

MODERN EVOLUTIONARY THOUGHT.

By Heber A. Longman.

PRESIDENTIAL ADDRESS, January, 1914.

At one time the process of evolution was looked upon as comparatively simple. It was asserted that the law of life was a demonstration of definite, regular, and unbroken progress ranging from simple, unicellular, primitive forms to complex, specialised, inter-associated and inter-dependent organisms, of which man and the higher animals are culminating points. Perhaps this can be best instanced by taking a work such as Drummond's "Ascent of Man." There it is stated that evolution is the study of "Nature in the vertical plane," showing continuous progress from low to high, an ascent which the forces of altruism triumphing over the powers of egotism, that "the same great patient unobtrusive law has guided and shaped the whole from its beginnings in bewilderment and chaos to its end in order, harmony, and beauty." This grandly simple view was at once grasped by popular imagination; it was seized upon by preachers as but an elaboration of the account of the creation in Genesis; it was the basic conception of popular science articles, and was epitomised by poets. There was also a tendency to make simple and dogmatic assertions as to the factors or dynamic forces of evolution, and both theological and anti-theological writers tabulated the facts of nature to suit their respective purposes.

But now we find it is necessary to qualify and amplify the old standpoints—not so much that they were inaccurate but rather because they were inadequate. Evolution itself is so demonstrably true, and is supported on so many grounds, that it scarcely seems worth while contradicting the few faddists who oppose it. But we are now concerned with problems as to the method and the meaning of evolution, and here the keenest thinkers are prepared to extend rather than to narrow their views, and to recognise varying influences instead of insisting on one sole principle.

Many factors have assisted to bring about this wider view of evolution. Since the genius of the great Darwin caused scientific workers "to think in terms of evolution," a powerful incentive has been operating. It is the glory of science that she knows no orthodoxy, and sets up no sacred system of authority. The work of all investigators is subject

to scrutiny and criticism. Theories must be fully tested to see whether they accord with facts. Hypotheses must be demonstrated by experiment. The great and only criterion for workers should be, "Is it true?" And science, with ever-widening knowledge, with the results of life-labours of a multitude of specialists, armed with new powers of observation and research, such as are to be found in present day laboratories, has come to widen her theories of evolution. Let us try to exemplify by two or three statements the positions of modern thinkers as compared with those of, say, 30 years ago. One may be epitomised in the words of Bateson: ⁽¹⁾ "No one can survey the work of recent years without perceiving that evolutionary orthodoxy developed too fast, and that a great deal has got to come down." Another is a recognition that sweeping conclusions are not always justified from a set of observations, and that generalisations which may govern the history of certain organisms may not be universal, and it is thus incorrect to project them through the whole realm of phenomena. Let me illustrate this by a reference to Mendelism. The Mendelic laws undoubtedly hold good in many cases, but they are notoriously contradicted or superseded in others, as a study of mulattoes, half-castes, hybrids, and mixed offspring reveals. Nor does the concomitant acceptance of what Mendelians call "independent inheritance" satisfy the critics. The supposed universality of the Mendelic principle has been largely suggested by focussing attention on certain points, and ignoring others. Heredity is more often a complex synthesis than a mosaic of dominants and recessives.

To my mind, the third, and perhaps the greatest distinction of many present-day workers, is their critical attitude towards teleology—or the doctrine of purposiveness in nature. Here we have varying schools, and a fierce, and not always courteous, controversy is raging in some of our scientific journals between their exponents. A brief review of the concepts of two leaders, Loeb and Bergson, will outline their standpoints.

Much of the work done by Loeb and by those associated with him is now well known. The experiments with sea-urchins are, perhaps, of the greatest interest. By raising the alkalinity of seawater Loeb and others are able to fertilise the eggs of sea-urchins with sperm of widely different groups, such as holothurians, brittle stars, and even molluscs, and heterogeneous hybrids are thus created. Variation and the life-form itself are apparently at the disposal of chemical processes. To quote Loeb's own words: "We know that growth and development in plants and animals are determined by definite although complicated series of catenary chemical

(1) "Darwin and Modern Science," p. 101.

reactions, which result in a synthesis of a definite compound or group of compounds, namely, nucleins."

Here may be appropriately mentioned the work of Poulton, who has shown that the colour of certain chrysalids is affected by the colour of surroundings, and may thus be either darkened or lightened at the will of the experimenter. A keen observer (Mr. H. Hacker), informs me that the species of *Pediculus*, or lice, common in South Africa, change from black to white, or vice versa, according to the colour of their host. In 11 cases out of 13, young flounders placed in an aquarium lighted from below showed the characteristic protective colouration on the lower and not on the upper side. In the abstract of the proceedings of the Linnean Society of New South Wales, October, 1913, there is noted an observation by Dr. H. G. Chapman of *Hyla cœrulea*, our common green tree frog, with the lower parts quite red, resting on the red leaf of a canna. There is an ever-growing amount of similar material recorded by numerous investigators.

Here I need make no apology for a parenthetical note :— In the history of humanity itself may we not trace responses to changes of environment. Take a slum child from dirty, unhealthy, and degrading surroundings; feed, clothe, and educate him properly; and he will in the generality of things respond to these stimuli. And there need be no wrangling in this case as to whether the impulse be mechanical or vital.

But let us glance at the other side. Bergson is claimed by the vitalistic school, and his luminous writings have given a qualified support to a new form of that view. According to him the whole scheme of evolution suggests a grand elaboration of the life-force, working ever upwards through its own original creative impulse, and that the past is justified in the present. Variations are not mere mechanical responses, but spring, to quote his own words, "from the very effort of the living being to adapt itself to the circumstances of its existence." This view, which may be summarised as a Neo-Lamarckism, is capable of admitting an internal psychological principle of development, although it is not bound to do so. Bergson claims that it accounts rationally for the phenomena of convergence, or the building up of identical complex organs on independent lines of development; such as the eyes of vertebrates, molluscs, and insects.

Thus, to use Samuel Butler's phrasing, the question largely resolves itself into a crux of luck or cunning. And an unbiassed observer may be tempted to assert that both factors are operating. Seemingly mechanical responses to external stimuli shed light upon, but do not altogether solve the problems of variation. Darwin's words are still true

to-day; we are woefully ignorant of the real origin of variations. That remarkable form of variation known as mutation was scarcely recognised by the old scientists. Darwin laid most stress on the continued selection of small and often trivial variations, but we now know that nature leaps as well as creeps. Sir Oliver Lodge, indeed, somewhat recklessly says: "So far from nature not making jumps, it becomes doubtful if she does anything else. Her hitherto placid course, more closely examined, is beginning to look like a kind of steeplechase."⁽²⁾

Systematists sometimes surprise us with their notes on variation. Agassiz found with his Echinoderms, as did Darwin with the Cirripedes, that variations were so great as almost to defy classification. And this is apparent in practically every branch of science. If a large amount of identical material is given to two men, aptly called Professor Splitter and Doctor Lumper (to borrow American terms), the former will probably make three times as many species as the latter.

Many variations are not to be wholly analysed as essential or even of partial utility to organisms. In the world of colour, particularly, there is much that may be looked upon as merely due to the exuberance of life and casual chemical processes. One might almost as well define on utilitarian lines the interaction of atmospheric dust with sunset glories as seek to map out a useful colour scheme in the variable foliage of a coleus or a caladium. On this point we may quote the authority of Darwin.⁽³⁾ Speaking of the colours of certain coral fishes Starr Jordan comes to a similar conclusion. The theories of recognition, nuptial, warning, and mimetic colouration do not account for everything. Bateson writes: "I feel quite sure that we shall be rightly interpreting the facts of nature if we cease to expect to find purposefulness wherever we meet with definite structures or patterns."⁽⁴⁾ Hugo de Vries says that "mutability seems to be free, and not restricted to previously determined lines." He notes that variations may be due to internal historical causes and to external causes, such as nourishment and exchanging environment. They may be, broadly speaking, of three kinds: the appearance of new characters; the reappearance of latent characters; the disappearance of existing characters. A much more intricate analysis is made by H. F. Osburn, an American writer, who enumerates no fewer than 24 expressions of heredity.⁽⁵⁾

Another important point which has been given some prominence of late is the view that similar structures often arise independently and in diverse ways. Hans Gadow has recently brought forward tabulated evidence of this.

(2) Pres. Address, British Association, 1913

(3) "Descent of Man," 2nd Edit., p. 262.

(4) "Darwin and Modern Science," p. 100.

(5) Journ. Nat. Sci. Phil., vol. 15, 1912, p. 246.

Certain exuberant growths of nature may be due to what Weismann calls "germinal selection," or the development of strong at the expense of weak determinants.

Both the small and the large things of nature puzzle us with their complexity. Herbert Spencer turned from the problems of stellar space and the movements of millions of suns to contemplation of the innumerable minute life-forms exhibiting endless variety, which have through long geological ages helped to form the floor of oceans. Only quite recently, by the aid of the microscope, have many of these become known to us, yet some of the Radiolaria, for instance, are among the most beautiful things in the world.

Whilst variation is the rule with most organisms, it is well known that certain creatures exist rigid and unperturbed over wide and diverse areas, and certain simple forms have apparently subsisted unchanged from Palaeozoic times. None the less we find evolutionary processes markedly influencing many of the lower organisms in comparatively recent eras. Wherever we find forms of life existing on a large scale, we discover associative organisms. Sometimes these are merely commensal and are harmless, or even of mutual utility; more often they are militantly parasitical, and a complex struggle for survival results. There is much evidence that many of the more virulent forms of parasitic life are essentially modern developments. Take for instance, some of the innumerable adaptations of parasitic hymenoptera, entozoa, and disease-creating bacteria.

Our present outlook is too circumscribed for modern man to focus the movements of life. Thus we must look to the past for a key; we must glance at the records of palaeontology. Much of our knowledge here is still in the making, for palaeontology is one of the youngest of sciences. But the facts now placed before us must be disconcerting to those who look for records of a simple, predestined plan of progress. The authority of A. Smith Woodward⁽⁶⁾ may be quoted to the effect that the general study of fossils gives some support to the mutation theory. Apparently there have been periods of perturbation and organic susceptibility, and also periods of comparative stability. Cope uses the term "expression-point" for the fixed and definite acquisition of some new character, resulting from these periodic outbursts of life.

In "The Evolution of Plants," D. H. Scott points out that "the past history of plants by no means shows a regular progression from the simple to the complex, but often the contrary. This apparent anomaly is due to two causes: One of these is the successive ascendancy of dominant families (as shown by the palaeobotanical record), each of which

(6) Ann. and Mag. Nat. His., Vol. 18, 1906, p. 316.

attained a maximum and then sank into comparative obscurity; the second is the revelation that the necessities of existence sometimes made progress a development from the complex to the simple—a reversal of the general plan.”

To these concise extracts illustrating the complexities of evolutionary processes, one might add the evidence for man himself. It seems probable that nature tried her prentice hand several times before man, as we know him to-day, developed from simian ancestors. Certain fossils, such as the well-known *Pithecanthropus erectus*, are almost more ape-like than human. But we find also varying types, some of which apparently represented races which died out and left no ancestry. Remains have been found of early men with comparatively large brains, of long-headed and broad-headed men, of men with small teeth and of men with large, of almost chinless forms, and of one lower jaw with a remarkable chin. Thus, many anthropologists are suggesting that the human race evolved from more than one primordial stock. Our genealogical tree may be less simple than was once thought.

To take an Australian instance, let us glance at our extinct marsupial fauna. Very many of these are in no way direct ancestors of the forms we know to-day. The immense *Diprotodon*, with its five-toed feet, its dentition somewhat similar to that of the kangaroo, and its wombat-like limbs, may not be regarded as lineally associated with any representative of our modern fauna. It surely represents one of the great lateral off-shoots from the marsupial life of Tertiary times, and it apparently left no offspring for posterity. Yet there are associative, or, to use Huxley's term, intercalary types, such as *Nototherium*, *Euowenia*, and *Phascolonius*,⁽⁷⁾ which connect this bulky animal with the modern wombat and other forms, all of which had a common origin. I would not like to designate *Thylacoleo carnifex*, the so-called marsupial lion or hyaena, as a lineal ancestor of any of our present Phalangiers, and the same remarks might be applied to one or two other extinct genera. There are, of course, fossil representatives which show definite and lineal relationship with our present species, and some are obviously but slightly different forerunners. But we see that in Australia our animals, though largely isolated, were not merely marking time all through the ages. Life radiated out and specialised forms appeared, many of which failed to survive. Our past and present indigenes are not merely representatives of the pre-placental, primitive mammalian fauna which was probably almost world-wide in Mesozoic times. Evolution has taken place here as well as elsewhere, and there are evidences both of progress and degeneracy.

(7) *Phascolonius Gigas* now includes *Sceparnodon Ramsayi*: Sterling, Mem Roy. Soc. South Aus., vol. I, p. IV.

In New Zealand, where there were no mammals, the birds developed on remarkable lines. And so we read of many forms of flightless extinct moas, some of which were 9ft. in height. In Australia also we have fossils of struthious birds, such as *Genyornis*, not lineally connected with the emu. Here again is evidence of what I should like to call radial evolution.

Are we not too apt to judge the life of the past merely as a measure for the life of to-day? So far as the record of palaeontology is unfolded, we see that in each age the potentialities of the environment were realised to a full extent. The life of the past lived for its own time, as well as for the future. Groups of organisms now represented by a few surviving species once revelled in rich and varied life, and were dominant forms. Families once world-wide in range now only exist in isolated areas, and seem under sentence of extinction. To-day there are but few living forms of Cephalopods, but in Mesozoic times there are 5,000 species of Ammonites alone. The wealth of giant cryptogams in the Carboniferous period dwarfs the meagre forms of to-day, and we can find no adequate explanation for the extinction of some of these forms.

The history of this planet, since it first reached a biotic stage, is the story of exuberant and triumphant life, indifferent to the fate of derelicts, adapting itself to extremes of conditions, seemingly striving sometimes to attain the impossible, achieving here and there the grotesque and the monstrous, here and there the beautiful and—so far as we can gauge these things by human standards—the useful and the good. The great pulsating stream of life has gone on, indomitable and ever expanding, but many of its branches resulted but in termini, marking the extinction of certain forms. These were the failures of protean nature. They were in some cases the adventurous colonists of life; they had their day but failed to be potential for the future. The many processes of evolution exhibit wayward and chaotic wanderings in side-paths, with developments of weird and uncouth forms, which represent no intermediate stages. Looking back through the record of earth's changes, we find that whole races have come into being, and have been crushed out in the struggle. Monsters such as many of the specialised reptiles of Jurassic times came across the stage of life, and left but a bulk of bones—in some districts forming veritable Golgothas—memorialising the powers of life and death. And whilst there has been in many respects a general upward trend, whole orders of animals have come under the potent influence of what science calls degeneracy; they have fallen from their high estate.

Thus the records of palaeontology present many difficulties to those who favour teleological conceptions and for the supposed law of orthogenesis. Palaeontology gives us largely the weeding out of certain forms. It chiefly demonstrates a process of relentless extermination and determination by natural selections. The non-adaptable forms were inevitably lost, for many of these were apparently the over-specialised—the victims of hypertrophy. And so came about the marvellous fitness of certain things for their present environment. Thus were secured the wonderful inter-associations of plants and insects, parasites and hosts, organisms and habitats. Darwin pointed out that the working of the laws of natural selection stultifies the old argument for pre-conceived design, and our fuller knowledge to-day does not give us material wherewith to criticise this view.

But there is a new significance that some might call teleological, and this may be briefly outlined, though it may not satisfy those who prefer the old concepts. There may be seen a purpose in the omnipotence of life-power, in the apparently secure foundation of life itself—life which radiates out to the full gamut of potentiality; life, the main stream of which goes ever onwards, always extending, even though myriad off-shoots are lost in the struggle; life that cannot always be measured in terms of progress, that moves downwards as well as upwards, that has developed venom of snakes as well as the milk of mammals, that has given birth to the tape-worm and to man; life that is indifferent to ideals of goodness or evil, that is callous and cruel or benevolent and kind, that is fortuitous, and even at times stupid, and that also startles us with some of its ingenious adaptations; life and nature, symbolised by the poet as half-devil and half-angel.

In conclusion, let us remember the optimistic ideals of one of our greatest scientists, Sir Ray Lankester, of man's attitude towards this raw material of nature. Man is "nature's insurgent son." He is the subduer, the reclamer, the utiliser, the rectifier, the great world-worker. He lies in front of him herculean labours. New knowledge has brought new obligations. There must be no sighing for a life of lotus-eating. Man has now come of age, and man has now to enter into his kingdom. These are stirring ideals and of high ethical import. And we of the rank and file of science may well be proud to echo them, and to endeavour in our own way to play a small part in "this business of mankind."

BIRD LIFE ABOUT GAYNDAH.

By Dr. F. Hamilton Kenny.

I desire to review in serried rank my friends—the birds of Gayndah. I shall use my primer, Leach's "Australian Bird Book," for the purpose of naming and putting each unit in its natural order and family, and jot down anything I may have noticed or desire to say on bird life.

The Orders: twenty-one of them, and each save one reveals a type, and is named accordingly. For instance, *lari-formes* and *ardei-formes* for gull-forms and heron-forms. Twenty of the orders have their names ending in this word "formes"; *Coccyges*, the Cuckoos, present the sole exception.

Then note how the Orders split up into Families. There are 165 families in this primer. They are not all Australian families, but relatives, allied families, living elsewhere in the world. How this helps one to get a comprehensive grasp of the world's avifauna! I think this is a great point in teaching, to show young people how Australian forms fit into the scheme of life, and how from your known local forms you reach out to the unseen but easily comprehended allied forms of Africa, South America, Europe and Asia. This primer is excellent in that way. After the families come genera and then the units—the malleable, plastic, variable bricks that in the workshop of great nature are moulded and expressed, and which we men call species. Are not they the very threads of the warp and woof of the time spirit's garment of life?

Well, now, having outlined my programme, let me say a word on Gayndah. The river is the main thing—the Middle Burnett. A wide expanse in flood time, the home of *Ceratodus* the Lung Fish, *Mugil* the Jumping Carp and *Arius* the Jew Fish. A broad beach of sand lines both banks, and here the birds play,—Pee-wee, Plovers, Herons, Cormorants and Pelicans. The yellow *Jussiaea* covers the bank, and you note the humble white *Herpestis*, who like the Queen in "Alice in Wonderland," can't keep her crown on. (I should explain that the *Corolla* tumbles off with or without provocation). Huge blue gums (*Eucalyptus tereticornis*) with their buds in long caps—like Welsh hats I always think—grow well, and so does an exotic—*Celtis Australis*, a superb shade tree. Children call it the berry tree—a green and blue, a red berry beloved and spread by *Graculinas* of crow lineage. You see these big magpies tumbling and tossing and talking in berry time, almost hidden in the leaves. The river, its banks, the trees, really make up my locality, and a gloriously happy

one it is for birds and beasties. Now, I must get right down to *my* orders, *my* families, and see what *I* have.

Order No. 1 is the Emu order. I have not seen him, nor am I likely to, with marsupial boards all over the place. He is said to have spread the "pear" here, which is probably true, but Homo (?) Sapiens started that curse anyway, and let it go on, too.

Order 2 is the Fowl order, the game bird order. My unit here is the Yellow Wattled Brush Turkey. Fairly plentiful, but the "pear" hides him.

Order 3 has the three-toed Quails, but not a quail have I seen around Gayndah so far; nor have I heard them call at night.

Order 4 is that of the great Pigeon family. Australia is easily first in the world for pigeons. For variety of form, for the number of forms, and for extreme beauty, Australia holds the palm. I have seen but one species here—a ground dove (*Geopelia tranquilla*). The male goo-goo morning and evening with thrilling vigour. I have seen him swell his chest feathers and spread his small tail, and goo-goo his level best to, so far as I could judge, a passive feminine.

Order 5 is Ralliformes, the rail order; and here I have noted but two species, the Bald Coot and The Coot (*Porphyrio melanotus* and *Fulica Australis*). *Fulica's* eye and mine met, and I saw *Fulica* no more. A timid soul! My son and I were swimming the Burnett, 65 yards across, at 6.30 one morning, when he said: "Dad, there's a big bird with a red bill!" That's all I've seen of *Porphyrio*, but of course both he and *Fulica* are common, but very shy.

We pass the Grebe order, the Penguin and tube-nosed swimmers' orders, and we come to the Gull and Tern order. Terns *have* been seen, but not by me. I have seen Terns at Tamworth, in N.S.W., and *plenty* at Gympie, so they travel well inland.

Order 10 has a big name, Charadriiformes. It's the big Plover order. Gayndah knows three species very well indeed. The Stone Curlew, or thick knee, with its weird, wailing, haunting cry; very common through the evening, night, and early morning. The handsome spur-winged Plover, with its big distinctive call, olive-brown plumage above, white beneath, yellow wattled and spur on the wing, frequents the sand banks in small mobs of 5-8. The commonest of all is the round-winged black-fronted Dottrel. He is the only species of dottrel I have seen. Very small, very cheerful and jolly, very tame and friendly. He is handsome with his white chest and black markings, and a velvety russet patch on his wings-coverts; small molluscs, insects, minute fish and mud, dribbling like a duck, form his food

and his amusement. His flight always reminds me of a sea bird, not a land bird; wings long, well out, and rounded. On a small scale I liken him to a petrel like the Cape pigeon.

Cranes I have not seen, and then we come to *Order 12—Ardeiformes*. Here I know well the straw-necked Ibis, friend of the farmer, foe to grasshoppers, and all the insect tribe. Two waders, *Herodias alba* and *Ardea novæ-hollandiæ*, are common. One is the White Egret and the other the Blue Crane. The egret I have only seen in the winter, but the blue crane both winter and summer. How they love stalking about the shallow pools. Their elegance, their dignified carriage, the ornament they are to our rivers, should save them alive, but man with a gun and a lust for useless slaughter is stronger than any love of beauty or fair play.

A friend of mine has seen the Jabiru—not the Jabberwock—on the river, but so far *my* only view of this noble bird was at Caloundra one fine Sunday morning.

Order 13 is Anseriformes—Ducks and Geese. The Black Swan is here (rarely) shot at sight, as the only one we had here this spring was. Useless slaughter of a noble bird! Mobs of Black Duck are very common, but hard to shoot. Their call note rings out clear during the night at odd times.

Under *Pelccaniformes*. We have two Cormorants, if not three, the Australian Darter and the Pelican. The two black cormorants, little and big, and the white-breasted, are to be seen on every snag and dead branch. You see also the Darter, the sole one in Australia, sitting even in the live blue gums. I saw two pelicans, full-grown, sitting on a log early one morning. Both cormorants and darter spread their wings and remain so for hours, sunning and drying themselves. This sun bath is their sole amusement early in the day. They let us bathe some 200 yards away, and take no notice.

Of the *Diurnal Birds of Prey*, Eagles, Falcons and Hawks, I have nothing to say. Now and again you see them wheeling in the blue, or hovering or harrying, but they are not common, and save the Kestrel or Harrier, hard to diagnose even with glasses. The sole *Nocturnal Bird of Prey* I know about here is *Ninox Boobook*, the Boobook Owl, whose "Morepork" note has been credited to the Podargus, a far-removed bird. The *native* Boobook is a far toner call note any time than Morepork.

Next we have the *Psittaciformes*, the Parrot order. Australia can boast of her parrots as well as her pigeons. She comes easily first in the world so far as I know in both these big orders. The scarlet-shouldered parrot, *Ptilistes*

erythropterus, is common here, and what a glorious bird it is ! See the sun light up the crimson on its wings, and you get some notion of a living flash of beauty. See a mob of these parrots wheel and flash in the sunlight, and you have seen a vision of colour that should remain in your memory.

In our hospital grounds some huge Agaves flowered, and the Blue Mountain parrots took charge of them, screeching, bubbling, fighting—a score at a time. Parrots are great honey eaters. I don't care for the way nature has blended her colours in the Blue Mountain, but she has made amends in the genus *Platycercus*, where the Rosellas come in. Other parrots here are the scaly-breasted Lorikeet, the musk and the little Lorikeet. I have only seen the white Cockatoo, with his ear-splitting screech.

Of Picarian birds about Gayndah, we can note several of great beauty as well as interest. The King-fishers and King-hunters, from *Halcyon gigas* to *Alcyon azurea*. We have also the Sacred and Macleay's king-fishers. The last-named has a call note of 3 or 4 P's—P.P.P.P. He and she drill a hole in a white ants' nest on the ground or in a tree, and nest there. Then we have the Dollar Bird, a migrant who comes in September from the North. He lives in the blue gums, sits well out on dead limbs, and has a lunatic cackle of a call-note that once heard is never lost. He's a handsome chap, and very strong and vigorous. He shows a white dollar on his blue wing as he flies, and his tumbling in the air has given him the name of Roller. The Bee-eater, *Merops ornatus*, is one of our commonest as well as a bird of great beauty. He and she drill an oblique tunnel in the ground or bank, and lay white eggs, as by the way do all birds who tunnel. No necessity for protective colouration is the up-to-date idea. Look at the exquisite and delicate tints of their plumage. See the long curved bill. Note the two elongated tail feathers, and above all note their floating in the air, and the curious high-pitched tremolo of the call note. This call note is so distinctive that though you cannot see yet you can swear to the bird. They frequent the river banks, dash into the water on the wing, and add a life and a vivid joy to bird life that I trust will never pass from Australia. The Frogmouth and Nightjar, and spine-tailed Swift all come in this order, but I have not met with them here, though I feel sure of their presence.

Our next birds are the Coccys—the Cuckoos. This is a favourite home of the huge Channel Bill and the Cooe Bird. I have seen also the common bronze Cuckoo. The Channel Bill and Cooe birds are migrants, the latter from Asia. He is coal black ; she spotted black and white. From this bird the Australian aboriginal must have got his cooe.

It is a beautiful, silvery, insistent, brain-piercing cooee. From the leafy interior of mulberry trees and our exotic celtis, he cooees regularly in the early morning and evening. The Dollar Bird is probably the foster parent both of this Cuckoo and the Channel Bill. The Channel Bill has a voice—the worst I know. It's a vast, prolonged squawk, squawk which you can hear a mile away. Very fond of mulberries is this bird, and very sly too. The Channel Bill arrived this year in September, the Cooee on October 6th, and both announced their advent by their call notes long before I saw them.

Twice have I seen the ordinary bronze Cuckoo about Gayndah, and one had a caterpillar in his mouth. Larvae are destroyed in great numbers by cuckoos. They are great insect eaters. This small cuckoo with its barred breast and bronze mantle is a very handsome bird.

Last, but biggest of our orders is that of the Perchers, or *Passeriformes*. This order holds three-fifths of the world's avifauna.

We will just glance at the Genera and some of the species I know here. The Welcome Swallow and Tree Martin, but not the Fairy Martin, are here all the year round.

Then we have Jacky Winter (*Microeca fascians*) but no Robins. Fan-tails in the two species, black and white, and the white shafted fan-tail. We have also the Grinder (*Scisura ingruit*). Then we have Graucalus, the cuckoo shrikes, in Parisian grey, with black top knots. Boys call them Jays and Summer birds, and their nests are hard to find. You can always tell a Graucalus. Watch him or her settle. They will raise first the one wing and then the other—always. I know no other bird that does this. Once only have I seen Lalage—the white-shouldered caterpillar eater—a rare vision.

Babblers, Pomatorhinus, Happy Family, two kinds, dark head and white head, are here. Their name describes their restless vociferous nature. Wood Swallows (*Artamidae*), are here. *Artamis sordidus*, neatest of birds, with a swimming, floating movement in the air, and an unmistakeable call note. Listen to call notes, you get fascinated by them. You hear them and the vision of the unseen bird flashes at once into memory. I have heard swans calling high in the heavens, on dark nights. It gives me ever a pleasureable thrill to hear and intellectually grasp what is going on in a world unknown to me.

Grallina picata, Mudlark or Peewee, is here, with his shrill Billee-Billee-ee note.

Then we have the black-backed, fluting crow, also Butcher birds. They hunt the silver-eye in my pines, and

gillotine them neatly and eat them. And then the black-throated one utters the wildest, sweetest call note I know. You must listen to its intense wildness and sweetness. It's a sweet, wild, gipsy note.

Then we have the *Pachycephala* or Thickheads, and they can trill gloriously, or rather *he* can. We have honey-eaters, Silver Eye, Wattle Birds, Friar Birds, Lewin's honey-eater, Lunulated Honey-eaters, Spine Bills. All these I have watched in orange trees. Finches abound—several kinds. The Oriole and Fig Bird eat mulberries and peperina (*Schnus molle*) berries. Bold, handsome, and red-eyed is the Fig Bird.

Then we come to our last family—the crown of the kingdom of the avifauna—the Crow family. What a black, thieving, cunning rascal a crow is! Why does a hen tell the crow she has laid her egg for him to at once rob? Surely nature is wrong to proclaim such a vital piece of news! Have not I seen him bearing away a small chicken from his friends and relations. *Strepera graculina* comes here, and if anyone needs a task, put into decent English his call note. For months I've tried and failed.

Now, I've ranged through some 50 species all within a mile of Gayndah Post Office. I have only fired one shot and killed one bird, a darter, and he is immortal for years—his skin is, anyway.

I keep my eyes open, my ears open, and I have a pair of field glasses. I claim that I have had much physical enjoyment in detecting and watching these beautiful creatures, and I also claim that I have intellectually benefited by being able to fit my little bit of Gayndah avifauna into the vast world picture that holds this planet's avifauna—past and present.

BOTANIC NOTES No. 3*.

By C. T. White.

The following notes relate chiefly to specimens of interest collected on the various excursions of the Field Naturalists' Club. Some new habitat records are published from specimens collected by members on visits to various localities.

Pittosporae.—*Bursaria incana*, Lindl: B. spinosa, Cav. var., incana, Ewart, Rees and Wood. Proc. Roy. Soc. Vict., 23 (n.s.) 55. Rosewood, F. N. C. Excurs., May 1913.

Malvaceae.—*Hibiscus splendens*, Fraser. Goodna scrub, F. N. Club Excurs., March, 1913.

* No. 2 *Queensland Naturalist*, 1, p. 256.

Rutaceae.—*Zieria laevigata*, Sm., var. *luxiflora*, Benth. Currumbin Creek, *F.N.C. Excurs.*, Sept., 1912. Russell Island, *F.N.C. Excurs.*, Sept., 1913.

Boronia polygalifolia, Sm. Goombungee (Darling Downs), C. T. White, January, 1913.

Zanthoxylum brachyacanthum, F. v. M. Pl. Vict., 1, 108; Benth., Fl. Austr., 1, 363. Rosewood, *F.N.C. Excurs.*, May, 1913. This is a very common plant in the district and the specimens show axillary and terminal inflorescence as described by Bentham, l.c.

Maiden and Betcher Proc. Linn. Soc., N.S.W., XXX (1905), 358, describe the inflorescence in N.S.W. specimens as always terminal.

Meliaceae.—*Owenia venosa*, F. v. M. Crow's Apple, Rosewood, *F.N.C. Excurs.*, May, 1913. This in the scrub is a tall straggling tree, but in the open forms a beautiful dome-shaped head similar to the western *O. acidula* (Emu Apple).

Leguminosae.—*Jacksonia Stackhousii*, F. v. M., Tweed Heads, *F.N.C. Excurs.*, September, 1912; Noosa, H. A. Longman, Sept., 1912.

Bossiaea rhombifolia, Sieb., Goombungee (Darling Downs), C. T. White, Jan., 1913.

B. ensata, Sieb., Noosa, H. A. Longman, Sept., 1912.

Daviesia ulicina, Sm., Goombungee (Darling Downs), C. T. White, Jan., 1913.

Cassia Sophora, Linn., var. *pubescens*, Benth. Goodna, *F.N.C. Excurs.*, Mar., 1913.

Acacia linearis, Sims, Currumbin Creek and Coolangatta, *F.N.C. Excurs.*, Sept., 1912; Macpherson Range, C. T. White, June, 1914. This is the common "Sally Wattle" of the Springbrook district, Macpherson Range, and after a fire through the fallen scrub this species comes up very densely.

Acacia polybotrya, Benth., var. *foliolosa*, Benth., Goodna, *F.N.C. Excurs.*, Mar., 1913.

Myrtaceae.—*Myrtus tenuifolia*, Sm., Blackall Range, Miss H. D. Clark, Mar., 1913. A glabrescent form; the under surface of the leaves even in the youngest shoots are not white underneath, but the very young branchlets are more or less silky; when better known may be worthy of a distinctive name.

Rhodamnia argentea, Benth., Currumbin Creek, *F.N.C. Excurs.*, Sept., 1912; Goodna Creek, *F.N.C. Excurs.*, Mar., 1912. Berry black, globular, 8-12 mm. (3-5 lines) diam. Seeds whitish, smooth 4-5 mm. (2 lines) long.

R. trinervia, Blume, Coolangatta, *F.N.C. Excurs.*, Sept., 1912.

Compositae.—*Brachycome marginata*, Benth., Clifton (Darling Downs), C. T. White, Dec., 1912.

Olearia Nernstii, F. v. M., Coolangatta, F.N.C. Excurs., Sept., 1912.

Picris hieracioides, Linn., var. *squarrosa*, (Steetz), Benth., Hendon (Darling Downs), C. T. White, Dec., 1912; Nerang, C. T. White, Dec., 1913. A weed in both localities.

Epacrideae.—*Melichrus urceolatus*, R.Br., Goombungee (Darling Downs), C. T. White, Jan., 1913; Coolangatta, C. T. White, Dec., 1907; Herberton, N.Q., Dr. F. H. Kenny, Jan., 1912.

Brachyloma daphnoides, Benth., Goombungee (Darling Downs), C. T. White, Jan., 1913.

Solanaceae.—*Duboisia myoporoides*, R.Br., Sandy land near seashore between Burleigh Heads and Currumbin, F.N.C. Excurs., Sept., 1912.

Loranthaceae.—*Viscum australe*, Bail., Warwick, F. C. Hall, Oct., 1913. (Parasitic on *Heterodendron diversifolium*).

Euphorbiaceae.—*Ricinocarpus speciosus*, Muell. Arg., Noosa, H. A. Longman, Sept., 1913.

Commelinaceae.—*Commelina cyanea*, R.Br., var. *alba*, Bail., Enoggera, F.N.C. Excurs., Mar., 1914.

Gramineae.—*Panicum uncinatum*, R.Br., Goodna scrub, F.N.C. Excurs., Mar., 1913. This peculiar grass had not previously been met with so near Brisbane.

Andropogon fragilis, R.Br. (*A. brevifolius* Sw.), Goombungee (Darling Downs), C. T. White, Jan., 1913. This grass had not previously been met with in Southern Queensland, though recently recorded from New South Wales.

BOTANY OF THE EXCURSION TO TAMBORINE MT. 1-3 MAY, 1915.—As a general account of the flora of the district has already been published in these pages,* there is only need here to refer to one or two of the more interesting plants met with. Owing to the heavy rains during the whole of our stay but little botanical collecting was accomplished.

Drimys dipetala, F.V.M. (*Magnoliaceae*). This shrub is not at all uncommon on Tamborine and neighbouring mountains.

Dysoxylon Fraseranum, F.V.M. (*Meliaceae*). A number of good fruiting specimens of this tree were gathered. The fruits are globose or pyriform, an inch or more in diameter, and are white, when ripe with a rosy tint, dehiscing and displaying the somewhat angular seed enclosed in the pulpy red arillus.

Senecio laetus, Forst., var. *lanceolatus*, Benth. (*Compositae*). An erect shrub 3ft. or more high, common on the tableland.

Teucrium corymbosum, R.Br. (*Labiatae*). The only Queensland habitat previously reported is Killarney.

* Shirley, *Queensland Naturalist*, 1, pp. 48 and 49.

NOTES ON A VISIT TO WEST AUSTRALIA.

By R. Illidge.

Having lately visited the south-west district of West Australia (September, 1913 to February, 1914), I have been asked to write some notes on the country, more particularly with regard to its natural history, for the F.N.C., and also to exhibit the specimens brought back.

My original intention of going straight from Albany to the foot of the Stirling Range, and there forming a camp, was unfortunately frustrated by the steamer not calling at that place on account of the small-pox scare. Hence, I landed at Fremantle, and had to make the best arrangements I could after arrival in Perth. The loss of part of my baggage detained me there over a week, but I made excursions daily to the various suburbs,—Guildford, Midland Junction, and Darlington on the east; Osborne, Claremont, Cottesloe and others on the west. At Darlington, in the Darling Range, I first made real acquaintance with the wild flowers of West Australia; at the other places they were but little in evidence, having been supplanted by weeds, old tins, bags, broken bottles, etc., in profusion. At King's Park, overlooking Perth Water, they have a reserve for the native flora, but I could not help observing that many of the indigenous plants were being replaced by foreign. At South Perth, I visited the Zoo, and found it excellently well kept, and with many fine plants and trees, forming a nice resort in pretty surroundings for the people.

The general features of the country may be divided into two main divisions, viz.,—the flat coastal country extending from the Darling Range to the sea, but broken by the dark-wooded range of hills near Cape Naturaliste, known as Blackwood Range, and by Mt. Lindsay, Mt. Frankland and other hills between Wilson's Inlet and the Leeuwin. All this part is well forested, in some portions densely so. Jarrah and Karri are the main timbers. The first-named seems to affect the ranges more, whilst the latter is only found in the extreme south-west. Between the Yallingup Caves and the Margaret River some good trees may be seen, but from that river towards Karridale the country has been stripped. The main future source of supply for karri will be in the tract from the Leeuwin east to Wilson's Inlet.

The second division consists of the elevated region extending east from the Darling Range. The Darling Range, averaging perhaps 800 to 1,000 feet; its highest part being about 1,900 feet. This plateau dips lightly down into the valley of the Avon River, and thence has a gradual ascending slope, with occasional depressions, for some hundreds of

miles, for at Coolgardie the level is about 1,400 feet. at Kalgoorlie over 1,200 feet, whilst at Laverton in the Mt. Margaret field over 200 miles N. by E. of Kalgoorlie, the height is more than 1,500 feet. It will, therefore, be seen that this plain differs from our western plain from Toowoomba to Charleville, which has a gradual downward slope. The relative distances being about the same, it is curious to note that the upward dip on the one side is about equal to the downward on the other. The plateau is in parts wooded, or consists, especially travelling eastward, of what is called sand plains. These sand plains are thickly covered with shrubs and flowering plants, and during the six weeks I spent among them were gay with flowers of brilliant colours. It is only in the shallow depressions called lakes that much sand is seen, for they are usually dry and bare, and incrustated with salt. However, I was fortunate in seeing one of them filled by a great storm, and the dry bed of a river actually running, before I left the district. Another feature of these plains is the outcrop of bare, reddish-coloured rock, sometimes acres in extent, and rising into low-rounded hills. Many of these hills contain deep crevice holes containing water, and known as gnamma holes, or, at the sides, the so-called "soaks." There are no considerable elevations in this region, the only one of any altitude being Mt. Burgess, near Coolgardie, of the usual saddle-shape in appearance, as seen from that town.

In the great plateau are also two belts of highly auriferous country, viz.—the Yilgarn and Coolgardie gold-fields. The latter is of vast extent, if we include the adjoining areas of East Coolgardie, North East Coolgardie, Broad Arrow, North Coolgardie, Mt. Margaret, Dundas, and Phillips River. The fine towns of Kalgoorlie and Boulder City being in the centre of the richest area; Coolgardie on the west; Kanowna and Kurnalpi, east; Norseman and Ravensthorpe, south; Menzies, Malcolm and Leonora, north; and Laverton, north-east of Malcolm; whilst numerous other smaller fields lie within and beyond. The country round Coolgardie and Kalgoorlie is barren and desert-like in character, though various trees, shrubs and small flowering plants are plentiful. Spinifex, the only grass has needle-like points, that at once command respect. The soil, a reddish or chocolate loam, is very rich, and wherever water can be used freely upon it vegetation thrives remarkably. The forests are disappearing rapidly, the demand for firewood at the mines being enormous. The vegetation of the western side of the plain consists of various eucalypts as the Salmon gum (*E. salmonophloia*), gimlet wood (*E. salubris*), York gum (*E. loxophlæba*), wandoo (*E. redunca*), Morrell (*E. longi-*

cornis), mallee (*E. oleosa*), jam wattle (*Acacia acuminata*), sandalwood (*santalum cygnorum*), and various smaller trees and shrubs, conspicuous among them being the W.A. quandong with its large bright red fruits, also species of *casuarina*. The gimlet wood is a remarkable gum tree, fairly straight, but looking as if longitudinal gashes, over which the bark had grown, had been cut out all round its stem with some sharp, round-edged chisel or adze. The salmon gum is a handsome tree. The sand plain country is much more interesting and beautiful, however, than the forest, and abounds with numerous fine flowering plants and shrubs. It is the flowering plants of these sand plains which attract many fine insects in *Coleoptera*, *Hymenoptera*, *Orthoptera*, etc.

The flora of West Australia is exceedingly rich, and the flowers of even the trees very showy. The gums (*E. ficifolia*, with large crimson flowers, and another with pink), are almost as florally brilliant as the poinciana, whilst the Christmas tree (*Nuytsia floribunda*) is unsurpassed in its glowing orange splendour. Blue flowers, so rare in our gardens, are of many kinds, and no blue can outvie the *Leschenaultia* (*Goodeniaceae*), especially when contrasted with the golden yellow *Hibbertia*. The kangaroo paw (*Anigozanthus manglesii*), with its metallic green and rich crimson, is strangely beautiful, as are all the flowers of the various species in this genus. The everlastings (*Helipterum*, *Helichrysum*, *Cephalopterum*, etc.) may be dried in a dark place, and so stored up to retain their hues much as insects are. The sun-dews (*Drosera*) are not the puny flowers we are accustomed to, and the ground orchids (*Thelymitra Caladenia*, etc.) are all fine flowering plants. In the *Amarantaceae*, *Ptilotus* far surpasses in its splendid colour any of our related garden flowers. The whole country away from the townships is marvellously beautiful. The ferns of West Australia are, however, very few and very poor, but this is amply compensated by the variety and beauty of the foliage of great numbers of small shrubs and delicate plants, so that they are scarcely missed. Another feature of the forests, especially the coastal region, is the abundance of grass trees (*Xanthorrhoea* and *Kingia*), and of the *Zamia* (*Encephalartos*), also honey-suckle (*Banksia*), notably a red-flowered species, and prickly Hakea, whose flowers are attractive to many insects. The limestone country between Capes Naturaliste and Lecuwin appears to have many plants and shrubs peculiar to it, and occurring in dense thickets along the coast. It is in this tract that very numerous and remarkable caves exist. I twice visited this district, on the first occasion going down the Yallingup Cave between Capes Clairault and Naturaliste. So far as explored, it descends about 150

feet or more, and has many grand passages and chambers. About 35 miles N. of Perth there is also similar country of limestone formation with many caves, but I did not visit it. Near Albany, and at Wilson's Inlet, 30 miles west, there is much country which reminds one of our Wallum flats along the North Coast, between Brisbane and Bundaberg. Some of it, however, fairly bristles with granite boulders of all sizes and shapes.

The fauna of the country is disappointing, especially as regards the bird life. Although a list of nearly 500 species of birds for all West Australia has been published, the bush is very silent indeed as regards them. It was at Wilson's Inlet I saw most, and there I came across the black cockatoos (*Calyptorhynchus Baudini* and *Stellatus*), the purple-crowned parrot (*Glossopsittacus porphyrocephalus*), and in addition to many others, the interesting little striated grass bird (*Megalurus striatus*), of which I saw and examined the nest in a dense swamp. Mr. Whitlock, the well known West Australian ornithologist, who pointed it out to me, informed me I was the only other beside himself who had ever seen the nest of this bird. When he had first found it the eggs were intact, but mice had afterwards destroyed them. Here also was the very beautiful blue water hen (*Porphyrio bellus*). These I saw following a plough picking up the grubs as turned over by it. At Hamel, midway between Perth and Bunbury, I first came across the 28 parrot (*Barnardius semitorquatus*), now become very destructive in the orchards. These with the Smoker (*Platycercus browni*) were also seen on many occasions in the forests bordering on the sand plains near Cunderdin, though the Smoker, I was informed, was rare. Of those pre-eminently beautiful birds the superb warblers (*Malurus*) I saw three species, one very like our Lambert's warbler (*Malurus lamberti*). These are but a few of the birds seen. Amongst reptiles I came across, those worthy of note include the Moloch (*Moloch horridus*), the stump-tailed lizard (*Trachysaurus rugosus*), both not uncommon on the sand plains; the latter also on the lower slopes of the Darling Range at Hamel. Geckos of several species in *Gymnodactylus* and *Gehyra* were common under bark. Insects are not nearly so numerous as in Queensland, but many fine forms in *Coleoptera*, *Heterocera*, *Orthoptera*, and *Hymenoptera* are present. In *Rhopalocera* (butterflies), about 36 kinds are known, and of these only a few are at all abundant. *Synemon* (*Castniidae*) a genus of moths with clubbed antennæ is largely represented, West Australia being the headquarters. They are active insects, and fly only in the bright sunlight. Sometimes they alight on the bare ground with the fore-wings covering the hind wings, which are usually gaily coloured,

or frequently they settle on a low twig with fore-wings wrapped round it, thus looking like a part of the twig. In either case, unless accurately located, it is difficult to find them. The Coleoptera contain strange forms in Helæides (*Tenebrionidae*), Leptops and Amycteridae in weevils (*Curculionidae*), and rich colours in jewel beetles (*Buprestidae*). Carabidae likewise are noted for many fine species in Carenides, some opaque black, others nitid and a few of glittering metallic hues. The longicornes, though not abundant in species, are remarkable for shining white spots and stripes. This feature is also noticeable in other orders, as Locustidae, likewise Homoptera. In some species, notably Anoplostethus opalinus, a rutelid beetle, very great variation in colour, is exhibited. In Hymenoptera the flower wasps (*Thynnidae*) abound. The males of these are wingless and carried by the females. At Wilson's Inlet one warm day, numbers of the large and handsome *T. browni* were flying round one particular spot, and I took many females all without their mates. After searching some time for the cause, I at last found a dead and dry female, and upon boxing this the rest of the males disappeared. I need say no more about the insects, for the exhibits will give a better idea of their variety and beauty both in form and colour.

The general character of the soil of the whole south-west of West Australia is arenaceous. The Darling Range has not a peak throughout its whole extent. It has been worn down and rounded off everywhere. There are certainly large outcrops of granitic boulders. The only peaked mountains I saw in West Australia were the Porongarups and the Stirling Range, clearly visible from Mt. Clarence, at back of Albany. The forest country east of the Darling Range contains soil of a loamy nature, largely utilised for wheat-growing, which is the chief industry of West Australia. The 1913 yield was about 14,000,000 bushels. Within the last few years they have also found the sand plains valuable, especially during dry seasons, for the same purpose, and these are now being taken up. The wheat belt is of great area, and extends from the Australian Bight to some distance north of Geraldton. Its greatest breadth is probably between Northam and Merredin, and lies midway between the Isohyetal lines of 10 and 15 inches, the lowest under which wheat can be grown for grain. As the rains are usually in winter, and generally reliable, West Australia is likely to become the chief wheat-growing centre in Australia.

Fruit-growing is largely followed on the slopes of the Darling Range, the principal centres being at Armadale and Jandakot, etc., near Perth, also in the range east of that city. Harvey, near Bunbury, Bridgetown and other places,

likewise round Albany and at Mt. Barker. The finest oranges (navel) are grown at Gingin, on the Midland Company's line north of Perth. The swamps, quite a feature of the south-west, are drained wherever possible, and the soil utilised for the cultivation of potatoes and vegetables, also green fodder for cattle. The greatest extent of cultivated country that I saw, lines in the Avon valley, that dip of the plain previously mentioned. Superphosphates and other manures are largely used everywhere, the quantity varies from 40 to 90 lbs. in the wheat areas, to half a ton or more in the coastal districts. Much of the apple crop was sent to Germany. I saw one small butter factory at Bunbury.

The climate is remarkably mild and pleasant, though whilst in Perth it seemed at times somewhat muggy. On the eastern plains the sky was usually cloudless, and the atmosphere very clear, especially in the early morning; objects many miles away all sharply defined, though sometimes tinged with a curious opalescent violet hue.

Perhaps the most notable reserve for the conservation of the native fauna and flora is that of the whole of the Stirling Range, some 50 miles or so north of Albany. The range is about 40 miles long, and the extent of the reservation some 300 square miles. The highest peak in the range is Bluff Knoll, 3,640 feet, and is situated in the east end. There is another large reserve to the east of North Dandalup and Pinjarrah. Again, the whole of the caves district between Capes Naturaliste and Leeuwin has been rightly tabooed and placed under trustees for the public benefit. The same should be done with the Lake Yanchep caves country, which is reported to contain many remarkably fine and highly beautiful caverns. At Perth is the King's Park previously mentioned.

In conclusion, I can only say that beautiful as is the South-West of Australia, for scenic variety and richness and fertility of soil, it is not to be compared to Queensland.

ICHTHYOLOGICAL NOTES.

By J. Douglas Ogilby.

Glossamia aprion, Rich.

The history of this fine cheilodipterid is interesting. The two first specimens sent to England were collected by the ill-fated Gilbert "in King's River, near Victoria, Port Essington." Gilbert, in his notes, states that it was known to the aborigines as "Mundurute," and that it was said to

be "a very local species," and not found "in the other very similar and close adjacent streams" of the Cobourg Peninsula. Three other specimens from the same locality were subsequently presented to the British Museum by Gould. From that time, seventy years ago, no mention of the fish has been made, and no further examples obtained until the specimen exhibited was sent to the Queensland Museum from the Norman River by Dr. Chas. Taylor, of Normanton. This, therefore, is practically a rediscovery. The specimen is also interesting in showing remarkably well the method by which the male cheilodipterid hatches out its young, the eyed ova filling the mouth and throat to their utmost capacity in this specimen.

Hyperlophus copii, Ogilby.

The Silver Sprat (*Hyperlophus copii*, Ogilby) visits the coasts of Southern Queensland and New South Wales in countless shoals of enormous magnitude every year during the winter months, and is destined—when our business men wake up—to become the very finest sardine of commerce. It is an especially interesting species, because it is one of the very few survivors of an old-time race of clupeids, which are distinguished by having an additional series of keeled plates in front of the dorsal fin similar to the ventral series present in most recent clupeids. These ancient herrings flourished during the chalk age, and are especially plentiful in the Green River Shales of Wyoming, whence Cope described many species. They also occur in the Upper Cretaceous of Bahia, Mt. Lebanon, Istria, and Dalmatia, and in the "Osborne Beds" of the Isle of Wight, so that apparently they were as widely distributed in Tertiary times as are the herrings and sprats of the present day.

FERN COLLECTING.

By Frank Burt, President.—Delivered February 12th, 1915.

Fern collecting is the title of this short paper. A simple subject, but perhaps appropriate for a Field Naturalists' Club, which aims to number amongst its members, those who make no pretensions to being "scientific," but are just as deeply imbued with a love of nature and all her handiwork as those who have devoted their lives to science. And just here I should like to say this about our Club. We have just completed another successful year, and the Club may truly claim to be a very live one; and as long as it continues its existence on the present or similar lines, it will

continue to be a very successful and useful institution. And I believe that this success is due in a very great measure to the fact that its membership consists of two classes—those who have made the study of science their life's business, and those who like myself are merely lovers of nature, and are seeking for more knowledge, as well as for opportunity for observation, and that between these two classes of members perfect freedom of intercourse exists, those with the greater knowledge in any one subject being always willing to impart their special knowledge to members in search of it. And I say, "Long may the present good-fellowship continue, and long may the Club prolong its life of usefulness!"

Now as to fern collecting generally. I have heard Prof. Skertchly remark that when the Brisbane Field Naturalists' Club visits any place there is not much left when they have done with it, and it might seem that to dig up and carry away plants from their natural dwelling places is assisting the general clearing away of natural flora and fauna which always follows the coming of man to new country. The carrying away of plants in this manner might be deprecated were it not for the fact that first of all the lover of nature will not wantonly despoil her nurseries, and secondly, that the possession and cultivation of plants afford great opportunities of acquiring knowledge of their habits, and of gaining a very great deal of pleasure from this occupation.

No doubt there is a sort of fascination attached to the collection or pursuit of that which has been made the subject of a special hobby, and I have derived the greatest of pleasure from searching new localities with the chance of seeing for the first time some species of fern, or finding, perhaps, an old friend in a new locality. And for natural beauty and gracefulness it were hard to find anything to beat the fern family, containing as it does so great a variety both in size and form—from the minute and almost microscopical exquisiteness of the genus *Trichomanes*, to the giant of the family, the Tree fern, which lends such an air of tropical splendour to the landscape which it adorns. To one whose early youth was spent in the colder climate of the Homeland, as mine was, the creek banks near to Toowoomba, clothed with the drooping fronds of the Maiden Hair fern (*A. Athiopicum*) were wondrous sights, and so were the clumps of Tree ferns (*Alsophila australis*) in the midst of a grove of Palm trees. Those of you who had the good fortune to attend the Club's excursion to Russell and Stradbroke Islands, will not easily forget the scene which met our view. As we neared the Eighteen Mile Swamp, we came upon a gully both sides of which were completely covered with the

golden green fronds of the Mountain Bracken (*Davallia dubia*), and as if that was not feast enough for the eyes, there were to be seen, nestling in the shelter of the larger fern, luxurious patches of the Umbrella or Star fern (*Gleichenia flabellata*). It is into such places of enchantment as these that the fern collector is naturally drawn, and whenever the existence of such a spot hitherto unexplored by him is heard of, he is eager to be there. Fortunately, Queensland contains such spots in almost unlimited numbers, and very few parts of it are entirely destitute.

Very many Queensland ferns are easily cultivated in an ordinary bush or shade house ; but there are also a large number which are very difficult to do anything with. I shall only refer to those which I would place in the former class, describing briefly where to look for those from which the best results may be obtained ; and here let me say that, as I have no personal acquaintance with the northern portion, I shall confine my attention almost entirely to ferns common to Southern Queensland.

Tree Ferns.—There are several kinds of ferns known as Tree ferns, but the one most generally known and cultivated is *Alsophila australis*, and well does it merit its popularity. It is fairly common in Southern Queensland, and is very hardy. It is usually found growing on the edge of a water-course, generally near a scrub, though often in shaded forest country. Where they are known to exist, or to have existed, small seedlings may often be found on the very edge of the water, or on very damp ground if well shaded, and the smallest of these may be easily coaxed into good plants. In planting these, it is well to remember that this fern very soon grows too large for the ordinary bush-house, and also that if planted in the open garden it must be sheltered from the cutting westerly wind and the scorching afternoon sun.

Todea barbara.—This is commonly called the Swamp Tree Fern. It forms a stem, but this, unlike the common Tree fern, may have more than one head to it, and each of these heads if removed with a portion of the stem (which by the way is not a true stem, but the root of the plant) may be grown into a handsome plant, if planted in a well-shaded spot. It is a beautiful plant, and well worth growing. It is plentiful at the foot of Buderim Mountain, and may be found on Stradbroke and in other coastal swamps.

The Prickly Tree Fern (*Alsophila Leichhardtiana*) is very similar to *A. australis* in habit, though perhaps not quite so large in growth. Its leaf stem is quite rough and prickly. It is, I believe, confined to the coastal scrubs, and plentiful on the North Coast.

Lomaria capensis, sometimes called the Red Cabbage Fern, is one which grows erect with a stem, after the manner of the Tree fern, though it does not attain a height of more than three to four feet. It is easily grown in a pot, and makes a handsome plant, its older fronds being a dark, glossy green, whilst its young fronds are of a reddish bronze colour. We found large quantities of it on Stradbroke Island at the large swamp.

Lomaria discolor is another fern of similar habit, and very useful for pot culture. It is somewhat smaller than *L. capensis*, but of even more regular habit, throwing up its fronds all round a central axis or crown. It is not by any means common, but may be found in the deeply shaded damp gullies between Helidon and Toowoomba, and I have had plants from Tweed Heads.

There are quite a number of ferns which have a very similar appearance, and it requires a very close examination of the fruiting fronds to be able to separate the different species. *Hypolepis tenuifolia*, *Davallia dubia*, *Polypodium pallidum*, *Polypodium punctatum*, *Dicksonia davallioides*, and sometimes *Pteris tremula* have fronds so much alike, that it is easy to be misled. These are all to be found within a few miles of Brisbane, several, if not all, growing beside the Enoggera Creek, near to the Stone Bridge, and are all easily cultivated, with the exception of *Davallia dubia*, which I have not seen in cultivation, and up to the present I have failed in my own attempts to grow. They are all ferns of large growth if given the requisite shade and moisture.

Of somewhat similar growth, but more symmetrical are *Asplenium umbrosum* and its more delicate variety *tenerum*. I have not found the former in its native haunts, but it is not uncommon amongst fern collections. The latter is to be found in the scrubs of South Queensland, Mr. C. White and I finding it plentiful at Currumbin. It is easily cultivated in pots or in the rockery, though it is very susceptible to want of moisture. Both these species are very desirable additions to the bush-house.

Climbing or trailing ferns are quite numerous in Southern Queensland, several being quite easy of cultivation. *Lygodium scandens*, that beautiful climber with pale green fronds, whose fertile pinnules are delicately fringed, must, I think, be given pride of place in this group. It may be obtained in almost any of the coastal swamps. It grows freely and will soon become a dense pillar of delicate green.

Polypodium scandens is another pretty climber which will also do well in a pot. Unlike the last-mentioned, its foliage is dark green. It frequents scrubs only, climbing the trunks of soft-barked trees.

Polypodium tenellum is much more difficult to transplant, though not impossible, as its roots are almost always tangled up with the roots of other plants and small rocks. It would if successfully grown well repay one for the trouble, as in its natural dwelling-place it almost completely covers the young trees up which it climbs with luxuriant tufts of glossy, dark green foliage. It is common in the scrubs along the Enoggera Creek, at Tweed Heads and other places.

Polypodium proliferum is a fern of trailing habit, and though perhaps less ornamental in its growth, has decidedly interesting features. It seems as if the parent frond (from which distinct young plants sprout at intervals of a few weeks) would keep on growing indefinitely, as my specimen attained a length of over eight feet, but it has no means of clinging to any support, and so trails along the swampy ground in which it grows. I have found it on the Darling Downs and in a creek just off the Waterworks Road.

Ferns for hanging baskets. There are quite a number of ferns which do well in hanging baskets. One of the commonest of our scrub ferns is *Asplenium falcatum*, and this does well in a basket filled with peat. The best specimen I have ever seen was grown in this way, with the aid of a liberal application of sulphate of ammonia, and as a fern basket it would be very hard to beat.

Gleichenia flabellata can be grown in the same way, but must be always kept damp, or it will not thrive. When successfully grown it makes a very pretty plant. When transplanting it, it is necessary to remove a block of soil containing the roots, as if they are disturbed failure is almost certain. It is not uncommon in swampy forest land, and some good specimens were obtained by members of the Club at Stradbroke.

A pretty little plant for the hanging basket is that commonest of all ferns, *Cheilanthes tenuifolia*, var. *Sieberi*, which, though found in almost every paddock, or on every bank in Southern Queensland, is yet very coy of being transplanted. The only time I succeeded in growing it was in a basket, and it certainly was very beautiful. *C. tenuifolia*, much rarer, is just as difficult to cultivate.

Polypodium rigidulum (Rock fern) and *Davallia pyxidata* (Hare's foot), both grow very easily in baskets or blocks of peat. The former is common at the back of Mount Cootha, and the latter is to be found in almost every scrub.

The Parsley Fern, *Botrychium ternatum*, is purely a forest growing fern and needs in its native state only light shade, as I have found it, near to Toowoomba, growing in large quantities, with scarcely any shade near it. It has a pretty light green leaf which very much resembles parsley,

both in colour and form. Each plant only sends up one pair of fronds a year, one fertile and the other sterile. At the end of last November, in company with Mr. White and Mr. Young, I took several specimens at Wellington Point. The fronds which were then on the plants soon died away, and they have each just sent up their two new fronds. It is easily grown in fairly light well-drained soil.

Now, I feel sure that this paper is getting monotonous, and though I have by no means exhausted the list of cultivable ferns of Southern Queensland, I will bring it to a close. Still, it would be quite incomplete did I not allude to the deservedly popular *Adiantum* or Maiden Hair family. Of these *A. Aethiopicum* is undoubtedly the best one to grow, as not only is it the easiest to grow, but it compares most favourably with many of the imported glass-house varieties. It may be obtained on the slopes of the ridges at the back of Mount Cootha, but it grows in much greater profusion on the ranges near to Toowoomba.

Adiantum Formosum, the giant Maiden Hair of the scrub also grows well under cultivation, but must have more shade than the other variety. It, however, is not so easily transplanted, as its so-called root runs some six or eight inches under the ground, and almost always amongst rocks. This, added to the fact that it is softly brittle, makes it a labour of patience—I might almost say a labour of love—to obtain sufficient to make a good showing. But when once it is established it grows very luxuriantly.

Adiantum hispidulum is the most commonly met with form of this genus, and grows in almost every dry gully. It is very hardy, and can, therefore, be readily transplanted. Very often, especially when exposed to the sun, its young fronds are very red or pink.

EXCURSION TO BRIBIE ISLAND, 2nd-5th APRIL, 1915. MOLLUSCA COLLECTED.

By J. Shirley, D.Sc.

PELECYPODA.

Arcidae.—*Cucullaea concamera*, Brug. *Arca chalcantha* Reeve. *Arca Helblingi*, Chem. *Arca trapezia*, Desh. *Glycimeris australis*, Q. and G. *Glycimeris holoserica*, Reeve.

Aviculidae.—*Pinna fumata*, Hanley. *Pinna serrata*, Sowerby. *Pteria lata*, Gray. *Meleagrina vulgaris*, Schu. *Malleus albus*, Lamk.

Ostracidae.—*Ostrea cristagalli*, L. *Ostrea glomerata*, Gld.

Pectenidae.—*Chlamys lividus*, Lamk.—*P. tegula* Wood. *Vola dentata*, Sowerby.

Anomiidae.—*Patro elyros*, Gray = *Anomia elyros*, Gray.

Mytilidae.—*Brachyodontes hirsutus*, Lamk. *Modiola vagina*, Lamk. *Septifer bilocularis*, L.

Pandoridae.—*Myochama anomioides*, Stutch.

Chamostracidae.—*Chamostraea albida*, Lamark.

Crassatellidae.—*Crassatellites kingicola*, Lamk.

Carditidae.—*Cardita incrassata*, Sowerby.

Chamidae.—*Chama jukesii*, Reeve.

Lucinidae.—*Lucina simplex*, Reeve. *Lucina fibula*, Reeve = *Codakia fibula*, Reeve. = *C. bella*, Conrad.

Cardiidae.—*Cardium rugosum*, Lamark. *Cardium setosum*, Redfield. *Hemicardium subretusum*, Sby.

Veneridae.—*Gafrarium scriptum*, L. *Macrocallista disrupta*, Sowerby. *Chione Dyseri*, L. *Chione nitida*, Q. and G. **Paphia radiata*, Chem.

Tellinidae.—*Tellina deltoidalis*, Lamk.

Donacidae.—*Donax deltoides*, Lamarck.

Mactridae.—*Mactra aegyptiaca*, Chem. *Mactra Cuvieri*, Desh. *Mactra eximia*, Reeve. *Mactra polita*, Chem. = *Australis*, Lamk.

Mesodesmidae.—*Atactodea striata*, Gmelin.

Solenidae.—*Solen Sloanii*, Hanley.

Pholadidae.—*Pholas australasiae*, Sowerby.

GASTEROPODA.

Trochidae.—*Monodonta labio*, L. *Monilea callifera* Lamk. *Monilea lifuana*, Fischer. *Calliostoma simile*, Reeve. *Calliostoma fragum*, Phil.

Turbinidae.—*Astrarium fimbriatum*, Lamk.

Littorinidae.—*Littorina pallescens*, Phil.

Cerithiidae.—*Pyrasus herculeus*, Martyn. *Pyrasus sulcatus*, Born. *Cerithidea Fortunei*, A.Ad.

Turritellidae.—*Turritella cerea*, Reeve.

Strombidae.—*Strombus Campbells*, Grif. and Pid. *Strombus vittatus*, L.

Tritonidae.—*Cymatium olearium*, L.

Cassididae.—*Cassidea areola*, L. *Cassidea coronulata*, Sowerby. *Cassidea nodulosa* V. *torquata*, Reeve.

Doliidae.—*Tonna Cumingii*, Reeve = *Dolium olearium*, L.

Naticidae.—*Natica marochiensis*, Recluz. *Polinices conicus*, Lamk. *Polinices* (*Natica*) *plumbeus*, Lamk.

Cypraeidae.—*Cypraea caput-serpentis*, L. *Cypraea caurica*, L. *Cypraea erronea*, L. *Cypraea subviridis*, Reeve. *Cypraea xanthodon*, Gray.

Volutidae.—*Scaphella* *magnifica*, *Chem.* or *Voluta*. *Scaphella* *zebra*, *Leach* or *Voluta*. *Cymbium* *flammeum*, *Bolten* = *Melo* *diadema*, *Lamk.*

Conidae.—*Conus* *Coxeni*, *Brazier.*

Nassidae.—*Arcularia* *thersites*, *Brug.* *Arcularia* *cancelata*, *Lamk.* = *Jonasi*, *Dunker.*

Fusidae.—*Fusus* *recurvus*, *Ph.* = *Urosalpinx* *paivae*, *Crosse.*

Muricidae.—*Purpurinae* *Drupa* *marginalba*, *Blainville.*

Coralliophidae.—*Coralliophila* *imbricata*, *Smith.*

Auriculidae.—*Ophicardelus* *australis*, *Q. and G.* = *O. Stutchburyi*, *Pfeif.*, *Ophicardelus* *Quoyi*, *A.Ad.*

Onchidiidae.—*Onchidium* *sp.*

Dredged, but all dead shells.

Donax *deltoidea*, *Lamarck.*

Chamostraea *albida*, *Lamarck.*

Glycimeris *holosericea*, *Reeve.*

Drupa *marginalba*, *Blainville.*

Macrocallista *disrupta*, *Sowerby.*

Mactra *aegyptiaca*, *Chemnitz.*

Arca *trapezia*, *Deshaye.*

Vola *dentata*, *Sowerby.*

Solen *Sloamii*, *Hanley.*

Tellina *deltoidalis*, *Lamarck.*

Mactra *sp.*

EXCURSION TO TAMBORINE MOUNTAIN, 1st-3rd MAY, 1915.

SHELLS COLLECTED.

By J. Shirley, D.Sc.

GASTROPODA.

Pulmonata

A. Aulacopoda

1. Zonitidae

Zonitinae

Limacidae

1. *Vitrina* *castanea*, *Pfr.*

B. Holopoda

II. Helicidae

Camæninæ

2. *Chloritis* (*Austrochloritis*) *mansueta*, *Pfr.*

3. *Thersites* (*Badistes*) *leuchocheila*, *Cox.*

C. Basommatophora

Limnæidae

4. *Limnæa* *Lessoni*, *Desh.*

5. *Isidora* *Lessoni*, *E. A. Smith.*

PELECYPODA.

Siphonida

Integripalliata

Cyrenidae

6. *Corbicula Deshayesiana*, *E. A. Smith*.

LIBRARY.

Exchanges continue to be received regularly. Prof. S. B. J. Skertchly has generously donated a copy of Leidy's "Monograph of the Fresh-Water Rhizopods of North America."

Dr. T. Harvey Johnston has offered to house the books in his rooms at the University until the Club has a room of its own, where they can be stored.

OBITUARY.

The veteran Queensland Botanist, Frederick Manson Bailey, C.M.G., F.L.S., passed away on Friday, June 25th, 1915, at the ripe age of eighty-eight. There are few Queensland naturalists who are not under some obligation to him for his untiring efforts to publish records of our flora; whilst his name and work are known to systematists all over the world. He leaves a series of publications which will cause him to be remembered so long as there are students of wild flowers in Australia.

The
Queensland Naturalist

The Organ of the Field Naturalists' Club
and its Branches.

VOL. II.

APRIL, 1917.

No. 2.

PROCEEDINGS.

JULY, 1915—APRIL, 1917.

EVENING MEETING, 29th JULY, 1915.*

Present : Miss F. Bage, M.Sc. (in the chair), and 18 members.

Reports : (a) Pond Life of Excursion to One Tree Hill Dams, by W. R. Colledge (illustrated by lantern slides); (b) Botany of the Excursion to Gold Creek, by C. T. White.

Lecturette : A lecturette, illustrated by lantern slides, on "Deep Sea Animals," was given by Miss Freda Bage, M.Sc.

BOTANICAL EVENING AND WILD FLOWER SHOW,
31st AUGUST, 1915.

Present : Miss F. Bage, M.Sc. (in the chair), and about 60 members.

Lantern Lecturettes : Dr. J. Shirley showed an interesting series of lantern slides of the lower orders of plant life (*Bacteria-Gymnosperms*), and gave a few succinct notes on each. Mr. C. T. White showed a number of lantern slides of native trees and shrubs.

Exhibit of Wild Flowers : The usual custom of arranging the exhibits in botanical order was departed from, and the specimens made up into bunches for sale; by this means and a silver coin admission, the sum of £4 6s. was realised, and handed over to the Queensland Patriotic Fund.



EVENING MEETING, 30th SEPTEMBER, 1915.

Present: Miss F. Bage, M.Sc. (in the chair), and 18 members.

Reports: On the excursion to Goodna: (a) Pond-life, by W. R. Colledge; (b) Botany, by C. T. White.

Exhibits: By E. H. Shearwin—Specimens collected at Southport (octopus eggs, the horny jaws of an octopus, and a number of shells).

EVENING MEETING, 28th OCTOBER, 1915.

Present: Miss F. Bage, M.Sc. (in the chair), and 35 members.

Dr. T. Harvey Johnston, M.A., gave an interesting and lucid address on "Microscopic Technique, with special reference to Section-cutting and Mounting."

Mr. C. D. Gillies, M.Sc., gave a demonstration on the use of different microtomes, the actions of various stains, methods of mounting, etc. The remainder of the evening was devoted to the display of objects under the microscope. Slides were exhibited by Miss Bage and Messrs. Colledge, Shearwin, Tanner and White.

EVENING MEETING, 25th NOVEMBER, 1915.

Present: Miss F. Bage, M.Sc. (in the chair), and 30 members.

Report: On the botany of the Virginia-Nudgee excursion, by C. T. White.

Paper: By Dr. J. Shirley, "On some Mollusca from Euri Creek, near Bowen" (vide Transactions, p.45).

Exhibits: By Dr. G. Comyn—Specimens of spiders. By H. Tryon—A collection of land-shells from Bowen. By J. Wheeler—Specimens of snail flower (*Phaseolus truxillensis*). By Miss E. N. Parker—Fruiting spray of *Ochna atropurpurea*. By R. L. Higgins—Flowering and fruiting sprays of *Combretum paniculatum*.

ANNUAL MEETING, 24th FEBRUARY, 1916.

Present: Miss F. Bage, M.Sc. (in the chair) and 24 members.

Special Business: Mr. H. A. Longman moved, and Prof. S. B. J. Skertchly seconded that the last clause of Rule VII. (2),—"All other members of the Committee shall be eligible for re-election, provided that with the exception of the Hon. Secretary, no member shall hold office for more than two consecutive years," be deleted. After some discussion the motion was carried.

Presidential Address: The retiring President delivered an address (vide Transactions, p.47.)

Office-Bearers: The election of office-bearers for 1916 resulted as follows:—*President*, T. Harvey Johnston, D.Sc., M.A., F.L.S., C.M.Z.S.; *Vice-President*, W. R. Colledge; *Hon. Secretary*, C. T. White; *Hon. Librarian*, Miss E. N. Parker; *Hon. Treasurer*, F. Burt; *Hon. Lanternist*, W. M. Tanner; *Committee*, G. Comyn, M.B., H. Tryon, R. Illidge, H. A. Longman, S. B. J. Skertchley, C. W. Holland.

Exhibit: By J. Wheeler—Specimen of a "Razor Fish," from Caloundra.

EVENING MEETING, 30th MARCH, 1916.

Chairman: Dr. T. Harvey Johnston.

Reports: On the excursion to Wellington Point (a) Pond-life, by W. R. Colledge; (b) Botany, by C. T. White.

Mr. H. A. Longman gave a few notes on some observations he had made on the fertilisation of the Anonaceous plant (*Eupomatia laurina*).

Prof. S. B. J. Skertchly delivered a lecturette, "On Some Further Evidence of the Antiquity of Man in the Nerang District, Queensland." He reported the finding of the site of an old camp on the Nerang River underlying 15 feet of alluvium. Evidence was shown in the shape of stone implements, burnt earth, and vegetable fibre. The site was laid bare by the cutting of a large drain through swampy country.

Exhibits: By Dr. T. H. Johnston—Drawings of the fish—Amphisile—showing its peculiar erect habit of swimming, specimens of which had been shown at the February meeting by Mr. Wheeler. By E. H. Shearwin—Young (foetus) of a forest wallaby. By J. Wheeler—Specimens of a Spirula, and jaws of a "Parrot-fish."

EVENING MEETING, 27th APRIL, 1916.

Chairman: Dr. T. Harvey Johnston.

Lecturette: By Dr. H. C. Richards—"Geology and Scenery in South-Eastern Queensland."

Exhibit: By C. T. White—A collection of the more interesting plants found growing at higher altitudes on the Macpherson Range, and Tamborine and Springbrook Plateaux.

EVENING MEETING, 25th MAY, 1916.

Chairman : Prof. S. B. J. Skertchly.

Reports : By C. T. White—(a) On botany of Easter excursion to Buderim Mountain ; (b) On the botany of the excursion to Enoggera Range and Bennet's Scrub. By W. R. Colledge—On pond-life of the excursions to Enoggera and Petrie's Quarry.

Exhibit : By Dr. G. Comyn—A specimen of the "Giant Earth Worm" (*Lumbricus megascolida*) from Buderim Mt.

EVENING MEETING, 29th JUNE, 1916.

Chairman : Dr. T. Harvey Johnston.

A welcome was extended to Mr. A. J. Campbell, C.M.B.O.U., the well-known Australian ornithologist, on his visit to Queensland.

Report : By W. R. Colledge—On the pond-life of the excursion to Indooroopilly.

Lantern Lecturette : By A. J. Campbell—On "Wattles," A very fine series of slides of different species of *Acacia* was shown by the speaker.

Exhibit : By C. T. White—A collection of herbarium specimens of *Wattles* of the Brisbane district.

EVENING MEETING, 27th JULY, 1916.

Chairman : Dr. T. Harvey Johnston.

Reports : On excursion to Ithaca Creek : (a) Botany, by C. T. White ; (b) Pond-life, by W. R. Colledge ; (c) Ornithology, by A. H. Chisholm.

Exhibit : By R. Illidge—A few Australian and foreign butterflies.

Reports were read by Mr. H. Tryon (1) As representative of the Club on a conference of delegates of scientific societies called by the Minister for Lands, to discuss with him matters concerning the welfare of the recently-proclaimed Lamington National Park ; (2) As representative of the Club on a committee appointed at a public meeting (convened by the Hon. Secretary, Royal Geographical Society of Australia, Queensland Branch) to wait on the Minister for Lands relative to the supervision and control of the Lamington National Park.

EVENING MEETING, 31st AUGUST, 1916.

Chairman : Dr. T. Harvey Johnston.

Reports : On the excursion to Chermiside : (a) Pond-life by W. R. Colledge ; (b) Botany, by C. T. White.

Exhibits : By Dr. G. Comyn—Specimen of a "Box Fish."
By Dr. T. H. Johnston—Specimens of a Feather Star dredged in Port Curtis, also larval or Pentacrinus form ; specimen of *Myzostoma* sp., a parasitic worm found in *Antedon macronema*, a Feather Star from Port Jackson, N.S.W.

EVENING MEETING, 27th SEPTEMBER, 1916.

Chairman : Dr. T. Harvey Johnston.

Reports : On Virginia-Nudgee excursion : (a) Pond-life, by W. R. Colledge ; (b) Entomology, by R. Illidge ; (c) Ornithology, by A. H. Chisholm ; (d) Botany, by C. T. White.

Paper : By R. Illidge—"Life History of *Trichaulax marginipennis*, and notes on other Cetonidae" (vide Transactions, p.50.)

Exhibits : By H. A. Longman—Live specimens of *Trachysaurus rugosus*. By W. M. Tanner—Photograph of a Sun Fish.

EVENING MEETING, 30th OCTOBER, 1916.

Chairman : Dr. T. Harvey Johnston.

Report : By C. T. White—On botany of excursion to Sunnybank.

Exhibits : By W. R. Colledge—A number of lantern slides representing some pond-life captures of more than passing interest made by him recently about Brisbane. By H. A. Longman—Growing plant of the ground orchid *Caleana major*. By R. Illidge—Three specimens of *Monarcha* or Fly Catchers, also illustrations of same from Diggles' "Australian Birds."

EVENING MEETING, 16th NOVEMBER, 1916.

Chairman : Dr. T. Harvey Johnston.

Report—By C. T. White—On botany of excursion to Darra.

Lecturette : By Dr. T. Harvey Johnston—On Microscopic Technique, "A Chat on Staining, etc."

Exhibits : By R. Illidge—Nests, eggs and newly-hatched young of *Gerygone cantator*. By W. M. Tanner and C. W. Holland—Miscellaneous objects under the Microscope.

EVENING MEETING, 31st JANUARY, 1917.

Chairman : Dr. T. Harvey Johnston.

A welcome was extended to Mr. W. H. Dudley Le Souef C.M.Z.S., the well-known Director of the Melbourne Zoological Gardens, on his visit to Queensland.

Mr. Le Souef delivered an address, illustrated by a fine series of lantern slides, "On the Australian Aborigines and their Foods."

ANNUAL MEETING, 22nd FEBRUARY, 1917.

Chairman : Dr. T. Harvey Johnston.

Presidential Address : The retiring President delivered an address on "Ecological Notes on the Littoral Marine Flora and Fauna of Caloundra" (vide Transactions p.53.)

Office-Bearers : The election of office-bearers for 1917 resulted as follows:—*President*, W. R. Colledge; *Vice-President*, C. T. White; *Hon. Secretary*, C. T. White; *Hon. Treasurer*, F. Burt; *Hon. Librarian*, H. Haynes; *Hon. Lanternist*, W. M. Tanner; *Committee*, Freda Bage, M.Sc., T. H. Johnston, D.Sc., M.A., R. Illidge, H. A. Longman, S. B. J. Skertchly, J. Wheeler, G. Comyn, M.B.

EVENING MEETING, 29th MARCH, 1917.

Chairman : W. R. Colledge.

Reports : On excursion to Goodna and Woogaroo Creek : (a) Pond-life, by W. R. Colledge; (b) Ornithology, by A. H. Chisholm; (c) Botany, by C. T. White.

Exhibits : By Dr. J. Shirley—Book of plant specimens, mostly European, and especially heaths. By Dr. G. Comyn—Young of a bat, *Nyctinomus plicatus*. By H. A. Longman—Living specimens of two of our smallest orchids, *Bulbophyllum minutissimum* and *Oberonia palmicola*. By E. H. Shearwin—Specimens of the small snake, *Pseudelaps Kreftii*, and specimen of Sea Pen, *Sarcophyllum grande*. By J. Wheeler—Specimen of fasciation in branchlets of Casuarina, cocoons of the spider *Dicrostichus magnificus*, and honey placed naturally in bottles by bees.

A few notes on the beautiful butterfly, *Charaxes sempronius*, were read by R. Illidge (vide Transactions p.64).

EVENING MEETING, 26th APRIL, 1917.

Chairman : W. R. Colledge.

Reports : On excursion to Myora : (a) Pond-life, by W. R. Colledge; (b) Fresh-water Rhizopoda, by C. D. Gillies; (c) Ornithology, by A. H. Chisholm; (d) Entomology, by R. Illidge; (e) Botany, by C. T. White.

Exhibits : By Dr. G. Comyn—Miscellaneous specimens of interest from Myora (Stradbroke Island).

TRANSACTIONS

MOLLUSCA FROM EURI CREEK, BOWEN.

By J. Shirley, D.Sc.

READ 25TH NOVEMBER, 1915.

* Species so marked are new to Queensland lists.

A former student of the Teachers' Training College, now in charge of the State School at Euri Creek, near Bowen, interested her pupils to collect for me a few marine mollusca from the beach near the school. The collection sent down proved a most interesting one, and contained several novelties that were specially welcome. The following is a list of the species received:—

PELECYPODA.

Arcidæ.—*Arca chalcantha*, *Reeve*.,, *pilula*, *Reeve*, s. *A. bicors*, *Jonas*.Aviculidæ.—*Pinctada vulgaris*, *Schumacher*.Mytilidæ.—**Modiola striatula*, *Hanley*.Crassatellidæ.—*Crassatellites pulchra*, *Reeve*.Carditidæ.—*Cardita excavata*, *Deshayes*.,, *incrassata*, *Sowerby*.Cardiidæ.—*Cardium reevianum*, *Dunker*.Veneridæ.—**Dosinia nitens*, *Reeve*.,, *Paphia variegata*, *Sowerby*.Tellinidæ.—*Arcopagia fabrefacta*, *Pilsbry*.Donacidæ.—*Donax australis*, *Lamarck*.,, *fabra*, *Chemnitz*.Solenidæ.—*Solen Sloanii*, *Hanley*.Mactridæ.—*Mactra dissimilis*, *Reeve*.Mesodesmidæ.—*Amphidesma striata*, *Gmelin*.

GASTEROPODA.

Trochidæ.—*Monodonta labio*, *Linne*.,, *zebra*, *Menke*.**Thalotia tricingulata*, *A. Adams*.

This small shell, common along our eastern coast, is synonymous with *Monodonta diminuta*, *Hedley*. In his *Studies of Australian Mollusca*, XI., P.L.S., N.S.W., xxxiv., p. 278, Mr. Charles Hedley recommends that this species be written off the Australian lists as unrecognisable.

**Calliostoma indistinctus* (*Wood*) *Reeve*. Tryon, *Manual XI.*, 128, says: "There is at the museum a series of Trochids collected by Peron and Lescur on the Australian coast, which represent exactly the figure of Wood. Their spiral liræ are salient and subgranose; the whorls of the spire project at the lower part." The specimen from Bowen agrees with Wood's figure, and with the above description.

Neritidæ.—*Nerita albicilla*, *Linne.*

**Nerita polita* v. *aurora*, *Dunker.*

Neritina oualenensis, *Lesson.*

Cerithiidæ.—*Cerithium polygonum*, *Sowerby.*

This shell is said to be synonymous with *Clava nodulosa*, *Brug.*; but there are constant differences, especially in the shape of the body whorl, which make the synonymy doubtful.

Cerithium articulatum, *Ad. and Rve.*

„ *petrosum*, *Wood.*

**Pyrazus fluviatilis*, *Pot. and Mich.*

Viviparidæ.—*Vivipara dimidiata*, *E. A. Smith.*

Strombidæ.—*Strombus auris-dianae* v. *melanostomus*,
Swain.

„ *campbelli*, *G. and P.*

„ *luhuanus*, *Linne.*

Pyramidellidæ.—*Pyramidella auris-cati*, *Chenu.*

Cassidiidæ.—*Cassidea pila* v. *Angasi*, *Braz.*

Cypræidæ.—*Cypræa annulus*, *Linne.*

„ *arabica*, *Linne.*

„ *errones*, *Linne.*

„ *lynx*, *Linne.*

„ *subviridis*, *Reeve.*

„ *stolida*, *Linne.*

„ *vitellus*, *Linne.*

Olividæ.—*Oliva funebris*, *Lamarck.*

Terebridæ.—*Terebra aciculina*, *Lamarck.*

Conidæ.—*Conus coronatus*, *Dillwyn.*

Mitridæ.—*Mitra subdivisa*, *Bolten.*

Nassidæ.—*Arcularia coronata*, *Brug.*

**Arcularia livescens*, *Philippi.*

A single specimen of this neat little species was obtained in a parcel sent from Rabaul, New Guinea; with this the Bowen shell completely agrees.

Nassidæ.—*Arcularia thersites*, *Brug.*

Columbellidæ.—*Pyrene varians*, *Sowerby.*

Muricidæ.—*Thais bufo*, *Lamarck.*

Evidently a common shell in this locality, some 15 shells, many of unusual size, forming part of the small parcel

PULMONATA.

Helicidæ.—*Thersites* (*Sphærospira*) *Etheridgei*, *Brazier*
Physa fusiformis, *N. and S.*

CEPHALOPODA.

Spirulidæ.—*Spirula peronii*, *Lamarck.*

THE FIELD NATURALISTS' CLUB.—ITS SCOPE AND
POSSIBILITIES.

By Freda Bage, M.Sc., F.L.S.

PRESIDENTIAL ADDRESS, February, 1915.

As any anniversary arrives, we find ourselves unconsciously pausing to think of the year past, and of that to come, and it seems to me that the annual meeting of a club is such an anniversary—a time to take breath as it were, and to look back at the view presented to us of our year's work, before continuing our journey. From our view-point, we shall see if we have kept to the aims and objects of our Club, and, if necessary, shall be able to set those objects once more clearly in front of us as our goal.

The past year has again been a successful one. The Club, in spite of the troublous times through which we are passing, has continued to fill a niche in the lives of its members. We have tried, in a small way, to help a patriotic fund. A bond of good-fellowship continues to exist between members of the Club, and those who know are always ready to help those who do not know.

In joining such a Club as ours, we show that we have a certain love of Nature. We wish to learn a little more about animals or plants or rocks, and to get into touch with those who have like interests. Such a Club is to a very large extent a hobby for most of us. Each member, as he joins, finds something to interest him—excursions, papers, exhibits of specimens, any or all of which fascinate him, whether he comes as a lover of Nature with a knowledge born of patient observation, as a student or teacher with a hard-earned laboratory knowledge of plants or animals, or as an interested beginner. All activities of the Club, are as I have said, fascinating; but I wonder if we all realise quite how much our Club can and should stand for. Do not most of us come to the Club meetings or excursions for recreation, just to swallow whole what is provided for us by a hard-worked committee, or by a few energetic members who are ready to inform us on any or every subject, without our even troubling to ask questions? It seems to me that for a Club to be effective, to mean much to all members, and to the community, something more is needed than this. Let us look at our main activities.

In regard first to excursions. As you all know, the fauna and flora of Australia are unique, but owing to the fact that they are rapidly disappearing, they must be studied now, or it will be too late. A Field Naturalists' Club is admirable for this purpose. Its excursions give us the chance of getting to, perhaps, out of the way places. We want not only collections of material from various sources, but also much in the way of natural history notes, e.g., what plants are characteristic of certain classes of country, what insects feed on or injure those plants, and how the flowers are fertilised. Much has been already done by individual members of this Club in collecting plants and compiling locality records, but I would suggest that even more might be done on our excursions if a leader were selected, and an object for the particular afternoon decided upon. Take as an illustration an excursion to Sunnybank. If the leader were Mr. C. T. White, and the object wild flowers, for the afternoon our main energies would be directed to observing species of plants, seeing their habits of growth, where possible, taking photographs of those plants and flowers, and, in some cases only, collecting specimens. Where all members were working with one object, those who knew but little to begin with, would soon find from the leader the commoner plants, and begin to recognise the rarer ones, and would glow with satisfaction on, perhaps, discovering a plant new to the locality. I venture to predict that by such methods the whole Club would do good work. The scheme is followed with excellent results in the Field Naturalists' Club of Victoria, where for each excursion a definite leader is appointed, and a definite object decided upon for the outing. Further, in London, I had the pleasure of going to two or three excursions of the Hampstead Scientific Society, where the same thing was done. Not only would beginners benefit by this method, but those who are specialists in a particular group would find themselves able to learn something about other groups. These specialists have practically always other opportunities for collecting, and when doing their own collecting, would then be able to recognise a possible rarity in fields other than their own. Much good and important collecting can be done in this way, for example, on the return of the Victorian Club, one year from an excursion to Wilson's Promontory, we landed on a small island in Corner Inlet. Here there was a danger of the native plants dying out, owing to the rapid growth of a few introduced plants which grew round a deserted hut. We landed all the party, fourteen in number, of whom only two or three were botanists, collected for two hours, and found, on comparing notes afterwards,

that we had between us from that acre of land over one hundred species of flowering plants, many of which were new for that part of Victoria.

May I repeat that all the members of the Club who go on an excursion should have a common aim for the time being, whether it be for the study of birds, flowers or insects, shells or sea-weeds. Every member of the Club should do his best to find out what he can about our fast disappearing fauna and flora before it is too late.

Secondly, in regard to Club evenings. It is not enough to find out things, and to keep them to ourselves. Energetic individual effort is needed, not only during excursions, but in regard to communicating the results of researches and observations made at those excursions, at the meetings of the Club. This can be done in form of papers or natural history notes. Scientific records should be given at other societies which publish their transactions frequently, e.g., much of the excellent systematic work which has been done from time to time by Club members has been rightly communicated to the Royal Society; but there is a great need of more help at our evening meetings in the form of general papers, observation notes, and exhibition of specimens. The Royal and other such societies are founded to record scientific knowledge; our function is to circulate such knowledge.

In this connection, I should like to emphasise the value of our Club in the matter of educating and influencing public opinion. We are members of a Club which has no party political feelings, and no vested interests, and, therefore, as a Club, we can speak with no uncertain voice when necessary. We have a serious matter before us now, the question of the reservation and control of the National Park. Some years ago, the same question agitated Victorian scientists. The Government of the day recognised vaguely that it would be a pity for the native fauna and flora of Victoria to die out, and after much representation from scientific bodies, arranged to keep Wilson's Promontory as a National Park. The Department which had control over matters, however, reserved the right to let certain parts of the Park for grazing purposes, and also reserved a coastal strip, both obviously impossible conditions, if native life was to be preserved. Much fighting took place, and finally the scientists gained their point, and the whole peninsular is now vested permanently in the hands of a Board of Trustees. Now, what I wish to stress is this. It was the Field Naturalists' Club that gave prominence to the position, and first educated, then roused public opinion, until the Govern-

ment was forced into granting the wishes of the experts. It was the rank and file of the Club who influenced public opinion in this, as they have done in other matters.

There are many other matters in which we, as a Club, should mould and sway public opinion. For example, we can insist on more bird sanctuaries being proclaimed, and can watch the laws in regard to close seasons, not only making the public keep these laws, but making them realise where they are inadequate. There is a huge amount of work to our hand in making the community realise that mosquitoes are not a necessary evil, and that their extermination should be demanded in the interests of public health.

To educate public opinion we must first be sure of ourselves, and in conclusion, I submit that a Field Naturalists' Club is not a place in which only those trained in science should teach the untrained (we have our schools and universities for that), but a meeting ground for the furtherance of Nature study. Each member knows something to interest his neighbour, and must not be afraid to tell it. "Give what you have to someone; it may be better than you dare to think."

LIFE HISTORY OF TRICHAULAX MARGINIPENNIS AND NOTES ON OTHER CETONIDÆ, ETC.

By R. Illidge.

READ 28TH SEPTEMBER, 1916.

Having occasion last June to destroy a decaying *Flacourtia cataphracta*, which was becoming unsightly as a garden tree, various larvæ of coleoptera were disclosed during the process, and amongst them were larvæ of the large and handsome cetonid beetle, *Trichaulax marginipennis*. As we had previously bred this species from the decaying wood of the same tree, one of the grubs was retained, thinking it might prove of interest, with the cocoon and perfect insects for a short paper, especially as its life history does not appear to have hitherto been recorded.

All the cetonid beetles which we have bred from larvæ belong to a rather useful class, for they assist in the disintegration of decaying timber, and do not attack healthy growing trees. (It will be better to explain, before proceeding further, that the *Flacourtia* was gradually dying from the insidious effects of white ant poison, and not from the attacks of these insects). The grub exhibited is about three parts grown, and should, in about two months or so from now (September) have formed its curious, large, indurated,

coriaceous cocoon, very different in texture to that of *Eupæcila australasiæ*, *frontalis*, and others. As the cocoons of these large cetonids were not cut open for fear of affecting the transformation, the exact period of change to pupa is a matter of conjecture. The beetle usually appears here late in January, and thence onward to March. It is very rare round Brisbane, but not uncommon in the Central districts of Queensland. The insect affects other trees, usually Eucalyptus, and our first capture of them in the cocoons was from a large fallen gum, in a decayed spout of which were about 20, all but three destroyed in the fall. The beetle has several times been captured about the garden of our home at Bulimba, and each time in a somewhat comatose state. One picked up was covered with ants, though still alive. After brushing off the ants, it was put in a large glass topped collecting box, and remained alive many days, but very lethargic. Had they been healthy, they would not have been so easily taken, being strong fliers, and noisy on the wing. Their usual haunts are high up on trees, probably among the blossoms, as is the habit generally of most of our local cetonid beetles. A clue as to the deposition of the ova of these beetles may be found in some remarks in this paper on *Trichaulax trichopyga*.

Eupæcila australasiæ.—In the same moribund *Flacourtia* were also larvæ and cocoons of the common cetonid *Eupæcila australasiæ*. This insect's larvæ and cocoons are found in all kinds of decaying wood, old fences being sometimes nurseries of them. It will not touch the living timber of trees, but is partial to the driest and hardest of dead wood.

Lamprima latreillii and *Lamprima splendens*.—Affecting this tree also was the splendid *Lamprima splendens*, a member of the Lucanidæ or stag beetles. The larva does not make a cocoon, but forms a chamber in the wood for pupation. Some of these chambers were so far in that it is a wonder the beetle ever sees the light of day. The grub, like those of the cetonids described, is useful in assisting the decay of dying or already fallen trees, and does not confine itself to any particular timber, though it is specially noticeable that scrub timber produces in the male sex a large and brilliant green form, whereas forest wood gives us the smaller golden coppery insect, also of the male sex. These are merely forms caused by a more nutritious sustenance in the one case, and a drier and less rich in the other. Many of these insects remain in the wood as perfect beetles all through our winter months.

Trichaulax concinna.—Many years ago, myself and a friend, whilst on a beetle hunt towards the Kelvin Grove Scrub, attacked a gum tree which looked very sick, and was

indeed only a shell, and soon fell to our joint attack with tomahawks. On splitting up, quite a nest of living specimens of this fine and rare insect was disclosed, and these were shared between us with great glee and jubilation. Unfortunately, we did not think to look further for cocoons or larvæ, and hence a good opportunity to gain knowledge of some of its life history was lost.

Trichaulax trichopyga.—Whilst on a visit to Gympie in its early days, when rich scrubs abounded in all directions, and only the timber-getters' tracks, and those rarely, were the roads into them, we (boys then, and after Queensland nuts far up on Eel Creek) were startled by one of these large beetles buzzing over our heads. Naturally, we stood and watched it, seeing it fly to and enter the hollow of a dark yellow wood, we detailed one to watch that it did not fly out, and set to work at felling. This accomplished, the next thing was to get the beetle, and we must have worked for over an hour, splitting up the tree, before we came across it. The creature had gone in and forced its way to the very bottom of the narrow hole, almost to where the cut was made to fell it; and had we commenced there a very few minutes would have sufficed. It turned out to be a fine large female specimen which, with another obtained under almost similar conditions, found its way to France, and was there described and named by Thomsen. The beetle has since been obtained in the Kuranda district of Queensland. As both specimens were females, we must infer that the object of the insect was to lay its eggs, and probably after doing this, it may emerge in a weak and sickly state, and so account for the condition in which *T. marginipennis* has been taken as recorded in our earlier remarks thereon.

Another large beetle in the garden affecting *Poinciana regia* is *Xylotrupes australicus*, a member of the Dynastidæ. The large grubs of this creature were abundant under the heaps of leaves raked up for leaf mould, and do not appear to add to the fertilising qualities of the mould, but fill it with large hard flattish oval lumps of their dejecta. A few years ago, some of these grubs were put in a large tin, filled up with partly decayed leaves, and with lid closed down, left exposed to sun, wind and rain for many months, and though occasionally looked to as to what was going on, it was not until one day near the end of January, on opening, several unusually large and lively beetles made their appearance. This insect breeds in numbers in megass heaps, spent tan, etc., and is not injurious to roots of plants, as are the larvæ of the Melolonthidæ and Rutelidæ, and other members of the Dynastidæ, such as *Pentodon australis*. The puparium is formed of agglutinated earth lined inside with fibrous vegetable matter.

Another very large Dynastid named *Scapanes solidus* has become extremely scarce about Brisbane through the destruction of the large turpentine, tallowwood and other stringy bark Eucalypts. Many times the huge larvæ of these were taken by a friend and myself from the large hollows of these trees, as also living and dead beetles. This larva, like the cetoniid mentioned, fed only on the decaying matter of the tree. Whether the beetle itself, as also the *Xylotrupes* is harmful is a moot question. The latter is said to score the bark of cedars, to obtain the sap, but there are not many cedars left to attack.

ECOLOGICAL NOTES ON THE LITTORAL FAUNA AND FLORA OF CALOUNDRA, QUEENSLAND.

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During my year of office, I have frequently called the attention of our members to the necessity for making and recording careful observations regarding the fauna and flora of our neighbourhood. I now propose to submit to you the following notes which are of a preliminary nature, a more detailed account being reserved for the near future.

Ecology is that particular branch of biology which deals with the relationship of organisms to their environment, *i.e.*, to their surroundings, and to one another. In the case of the marine fauna and flora, it will be recognised that organisms along the sea-shore are influenced by the tide, sea temperatures, storms, coastal currents, salinity, presence or absence of suspended mud, as well as the nature of the coast (*e.g.*, whether muddy, sandy or rocky, whether the rocks be sandstone, basalt, etc.) In this short account, I do not intend to enter into detail regarding these factors.

Owing to its biological interest, I have, for several years past, paid periodic visits to Caloundra, chiefly during May and June, but lately from November to March also. Caloundra lies at the northern extremity of Moreton Bay, immediately to the north of Bribie Island, from which it is separated by the very shallow and rather narrow Bribie Passage, or Pumice Stone Passage. The latter name has, no doubt, been bestowed because of the quantities of pumice which sometimes litter the neighbourhood, this having been carried from the New Hebridean volcanoes by the Notopectian current.

There are two rocky headlands, Caloundra Head (or Wickham Point) and Moffat's Head, the latter being the more northerly. They are formed of a Trias-Jura (probably Jurassic) sandstone, sometimes fine grained, sometimes coarsely conglomeratic, and containing a considerable quantity of iron. Imbedded in the rocks are large trunks and branches of fossil conifers, whose wood has been replaced by limonite, while in a few places on the cliff face of Moffat's Head, thin bands of coal and carbonaceous shale are to be seen.

Between the two heads is a short steep beach, while to the north of Moffat's Head is a gently sloping strand extending for miles, and behind which are several lagoons, that nearest the Head being Tooway Creek. The mouth of the latter is generally obstructed by a sand bar. Between Caloundra Head and Bribie Island the beaches are firm, and shelve gently to form the shores of the northern point of the Passage, which is practically a saltwater river, and here estuarine conditions prevail. My remarks relate chiefly to Caloundra and the beach on either side of it.

I desire to express my indebtedness to Mr. C. Hedley*, F.L.S., for stimulating my interest in this work, and for naming the Mollusca (other than Polyplacophora) forwarded to him; Mr. A. R. McCulloch, for identifying the Crustacea; Mr. E. A. Briggs, B.Sc., for naming the echinoids and some Coelenterates; Mr. Basset Hull, for recognising the Chitons; and Mr. A. H. S. Lucas, M.A., B.Sc., hon. algologist to the Sydney Botanic Gardens, for identifying all the marine plants mentioned (unless otherwise stated). Without such assistance, this sketch would not have made much progress.

Mr. Hedley has called attention to a fourfold division of beaches, viz., the *shingle beach*, *ocean reef beach*, *ocean sand beach*, and the *estuarine beach*. Of these, the last three are represented in the Caloundra area. Each possesses its own distinctive fauna, though a few species may be commonly met with in more than one type of beach, e.g., the oyster *Ostrea cucullata* and the littorinid *Bembicium melanostoma*.

THE OCEAN REEF BEACH.

On the rocky reefs of the Sydney district there are, according to Mr. Hedley, three well marked inter-tidal horizons:—(1) an *upper zone* between the high water of spring and neap tides, inhabited by certain peri-winkles (*Melaraphe* and *Tectarius*) and barnacles (*Chthamalus* and *Tetracrita*); (2) A *median zone* between high and low neap tides, characterised in that locality by a tube-forming annelid *Galeolaria*; and (3) A *lower zone* between low neap and low spring tides, where the cunjevoi or sea-squirt *Cynthia* is a dominant member of the fauna.

* Mr. Hedley has recently published a very interesting and valuable account of the ecology of the Sydney beaches. (Proc. Roy. Soc. N.S.W., 49, 1915, pp. 15-77, pl. 1-7.

On the Caloundra headlands, the inter-tidal area can be divided into four or, perhaps, five definite horizons, though, of course, each overlaps that immediately above and below it. Commencing with the highest in position, they are :—

(1) The *Tectarius* zone, in which a gastropod *Tectarius pyramidalis* is the only evident marine inhabitant.

(2) The *upper Melaraphe* zone, whose dominant animal is another littorinid, *M. mauritiana* (*M. unifasciata*) which in its lower limits includes the next zone.

(3) The *lower Melaraphe* zone or *Chthamalus* zone, the latter name being preferable as *Chth. antennatus* (a sessile barnacle) is the dominant organism at least on the exposed part of the area.

(4) The *Tetracrita rosea*—*Liolophura* zone, characterised by the presence of another cirripede *T. rosea*, and, in its middle and lower regions especially, of a chiton *Lio, queenslandica*. *Tetracrita* is common in the upper parts of the next zone, but there it is much smaller.

(5) The *Sargassum-Onithochiton* zone, in which the dominant organisms are the sea-weeds *Sargassum* spp., though other algæ are also common. The chiton *On. quercinus* is also abundant there, and is practically restricted to this horizon.

As secondary zones, I might mention (a) the *ocean rock pool*; (b) the *Siphonaria* area; and (c) the *Melaraphe infans* area.

The above-named zones can be correlated with those of Mr. Hedley thus :—His *upper* horizon includes my Nos. 1, 2 and 3; his *median* one coincides apparently with the main development of No. 4; while his *lower* zone corresponds to our No. 5. There is thus the same succession of horizons, though there is—as we might expect—some difference in regard to the dominant organisms. The very close resemblance of the fauna of Sydney and Caloundra ocean reefs is noteworthy. In both cases, the rocks are of Trias-Jura age, though the local series was laid down later, and should, according to Mr. A. B. Walkon, be regarded as Jurassic. Both reefs are sandstone, a type of rock which weathers in such a way as to afford support or protection for a host of organisms. There is, however, a considerable difference in latitude—about $6\frac{1}{2}$ degrees, and representing approximately 450 miles—and in sea temperatures, especially the minima of the two localities.

A. The *Sargassum*—*Onithochiton* horizon :—This zone is uncovered only at low spring tides. Its dominant plants are species of *Sargassum*, especially *S. leptopodium*, though others are not uncommon, e.g., *S. biserrula*, *S. auraliae*, etc.

Sargassa may cover extensive areas, a well developed sargassum occurring on the northern side of Moffat's Head, and corresponding to the hormosiretum of the Sydney district. *Cystiphyllum muricatum* and *Dictyota dichotoma* are very abundant. Amongst other sea-weeds occurring in this region and extending into deeper water are *Chondrococcus harveyi*, *Plocamium hamatum*, *Halimeda tuna*, *Caulerpa* spp., *Chaetomorpha aerea*, *Sphacelaria* ? *biradiata*, *Pachydictyon*, *Chondria dasyphylla*,* *Derbesia claviformis*, *Gymnosorus variegatus*, *Pardina pavonia*, *Codium elongatum* and *C. adhaerens*, *Peyssonnelia*, *Lithothamnion*, *Melobesia*, *Dilophus*, *Ceramium* spp., *Laurencia concinnia*, etc.

The characteristic animal of the zone is the variable and prettily-coloured *Onithochiton quercinus*. Associated with it are two rather uncommon chitons, *Plaxiphora pateliana* and *Rhyssoplax miles*, the last being rare. Small specimens of *Tetracrita rosea* are common. *Balanus nigrescens* occurs in the lowest inter-tidal region. Amongst the gastropods, the commonest are *Hemitoma aspera*, *Thais succincta*, *Drupa marginalba* and *Cellana variegata*. *Siphonaria scabra* sometimes extends its range downwards to this region. The ascidian *Cynthia præputialis* is not uncommon, especially on the south-west of Caloundra Head, but it is not a dominant form there as it is on the Tweed Heads rocks.

Amongst other members of the fauna, one may mention the occurrence of various sponges (*Clathria*, *Sycon*, etc.) ; *Ophiuroids* ; *Hydroids* (*Diphasia*, *Sertularia*, *Campanularia*, *Pussythea*, *Plumularia*, etc.) ; *Polyzoa* (*Membranipora*, *Catenicella*, *Electra*, etc.) ; *Pycnogonida* (on *Hydroids* and *Catenicella*) ; *Polychaeta* (*Eunicids*, *Nereids*, *Polynoids*) ; *Amphipods* (*Orchestia*, spp.) ; the peculiar Kelp crabs (*Naxia tumida*), which plant algæ on the carapace, and thus come to resemble the sea-weeds, amongst which they slowly creep ; and the beautiful Kelp shell (*Cantharidus eximius*), which lives on *Sargassum*.

Laurencia obtusa aerea.—Forming a fringe along the upper edge of the Sargassum horizon, there is in places a well-defined area characterised by the presence of a red sea-weed *Laurencia obtusa*, which at some seasons is almost green (November-December), while at others (March) it is purplish red. Its flora comprises also *Caulerpa nummularia* and other species of the genus, *Enteromorpha intestinalis*, *Chauvinia coriifolia*, *Lithothamnion*, stunted specimens of *Dictyota dichotoma*, *Sargassum leptopodium* and *Cystiphyllum muricatum*. Sometimes (March) *Ceramium clavulatum* is very common. *Chaetomorpha* and *Ulva* appear at certain times.

* This is a delicate plumose red seaweed with large fruits (November-January), named for the late Mr. F. M. Bailey, by Kew authorities as *C. dasyphylla*. My specimens have not allowed Mr. Lucas to accurately determine it (*Chondria* or *Dasya*). It resembles *Wrangelia plumosa* in its colour and general form.

The fauna includes *Hemitoma*, *Drupa*, *Cellana*, *Thais*, *Ostrea*, *Liolophura*, and small forms of *Tetracrita rosea*. The region is, perhaps, best regarded as being the upper portion of the *Sargassum* zone.

B. *Tetracrita*—*Liolophura* horizon.—This is characterised by the presence in abundance of the pinkish four-valved barnacle *Tetracrita rosea* and the chiton *Liolophura queenslandica*. The former is especially common on the cliff face, exposed to the dashing surf, and reaches its maximum development in this zone, though it occurs lower down also. It may form a very definite pinkish-white band on the rocks facing the sea. It is able to withstand the sun's heat and drying for many hours each day, and can live out of water for several days. Other members of the fauna are *Drupa marginalba*, *Bembicium melanostoma* (in sheltered situations, and extending upwards into the next zone), *Siphonaria scabra*, *Cellana variegata*, *Ostrea cucullata*, *Tetracrita purpurascens* (in cracks between rocks and under ledges), the anemones *Oulactis muscosa* (in cracks and shallow gutters), and *Paractis papaver* (under rocks and ledges).

The chief plant is *Enteromorpha intestinalis*, with *Ulva* and *Ceramium* occasionally..

C. *Chthamalus* horizon (lower *Melaraphe* zone).—The dominant organism here is a small, flat, six-valved barnacle *Chthamalus antennatus*, whose greatest development occurs immediately above the limits of *Tetracrita rosea*. It is generally coloured exactly like the rock surface on which it is situated. There is usually little evident vegetation in this zone which is submerged only during spring tides. Stunted narrow *Enteromorpha* may be present.

The fauna includes *Cellana variegata*, *Bembicium melanostoma*, *Melaraphe unifasciata*, *M. infans*, *M. acutispira*, *M. melanacme*, with *Tetracrita purpurascens* and *Paractis papaver* in sheltered situations. *Siphonaria* sometimes reaches this horizon. None of these are characteristic of the region as they attain their best development either above or below it. Owing to the abundance of littorinids, I consider that the name lower *Melaraphe* zone would be equally applicable, though the name *Chthamalus* zone is more distinctive since the barnacle has a much more restricted range. The latter reaches its maximum development only in exposed situations, *Melaraphe* spp. invading the horizon in more sheltered spots.

D. *Melaraphe* zone (upper *Melaraphe* zone).—The name is here applied strictly to that horizon where species of *Melaraphe* are the dominant, and almost the only forms of animal life. Though abundant in the last zone, they reach

their greatest development here. The *Chthamalus* horizon is, perhaps, to be regarded as the lowest portion of the *Melaraphe* zone, using the name then in a wider sense.

The commonest species is *M. unifasciata* (*M. mauritiana*). Another member of the fauna is *M. melanacme*, while *Cellana Bembicium*, *Siphonaria* and *Tetracrita purpurascens* may invade it. Young specimens of *Tectarius pyramidalis* also occur here.

Melaraphe infans sub-zone.—This includes the rather flat expanses of rock, especially on Caloundra Head, which lie at about the same level as *Chthamalus*, and extend inwards towards the shore. They are hot and dry during part of the day, and sometimes are encrusted with salt under the influence of a hot sun. There is no conspicuous animal or plant life, but on careful examination one sees immense numbers of tiny dark grey Mollusca, *Melaraphe infans*, and *M. acutispira*, huddled together and resembling fine coal grit caught in the irregularities of the rock surface. Sometimes a slippery filamentous *Enteromorpha* occurs here.

This sub-zone is a part of the *Melaraphe* zone in its wide sense.

E. *Tectarius* zone.—This horizon is characterised by the presence of only one marine organism typically, viz., *Tectarius pyramidalis*, a mollusc occupying a very wide zone, varying in width in different situations, according to the height to which spray is thrown at high spring tides. I have seen it occasionally at a higher level than the grass and lichens which mark the downmost limit of terrestrial vegetation on the ocean reef beach. *Tectarius* is a member of the Littorinidæ. We have noticed that the succession of species of the family here is just the same as in Sydney district. That with the lowest range is *Bembicium melanostoma*, which extends upwards into the *Melaraphe* zone; then come in ascending order *Melaraphe acutispira*, *M. infans*, *M. melanacme*, *M. unifasciata* and *Tectarius pyramidalis*. In the Bribie Passage *Mel. scabra* may reach even higher, being found on the stems and leaves of mangroves. Here the marine and land flora are not widely separated.

The Siphonaria region is very restricted, the term being used to designate those areas where *Siphonaria scabra* is the dominant organism. This is a common species, and extends from the Sargassum zone to the *Melaraphe* horizon. Where the rocks are fairly smooth, and slope towards the sea, affording little protection against the sweeping movement of the waves, few other organisms are present. Here the limpet snail *S. scabra* occurs in numbers as a low cone, with a few radiating ridges on its shell, and a distinct siphon on its right side. Irregularities of the surface may afford more shelter, and

then the shell becomes higher, the sides bulge more, and the entire shell comes to resemble that of *Cellana*. When the rock surface is rather more irregular, *Cellana* may be present. *Enteromorpha* is common here. *Hemitoma* and *Oulactis muscosa* are to be seen in the lower portions, i.e., on a level with the *Laurencia* area. The *Siphonaria* region reaches its best development on a level with the *Tetracrita* zone.

The ocean rock pool.—This is a zone of constant immersion, and links up with the *Sargassum* horizon, with which its pools may be connected by means of gutters or cracks in the rock. It is the most interesting of all the inter-tidal regions, as it has the richest and most diversified fauna. Its plant life is varied, being similar to that of the *Sargassum* zone in the case of deeper pools, while in the shallower ones, *Corallina officinalis*, *Jania rubens* and *Padina pavonia* are common. In the former, one may see *Sargassum* spp. (*leptopodium*, *biserrula*, *claviferum*, etc.), *Cystiphyllum muricatum*, *Hormosira articulata*, *Padina pavonia*, *Gymnosorus variegatus*, *Gelidium corneum*, *Chondrococcus harveyi*, *Dictyota dichotoma*, *Dilophus*, *Galaxaura elongata*, *Halimeda tuna*, *Sphacelaria*, *Plocamium hamatum*, *Laurencia concinna*, etc., while on rocks is an encrusting form, *Lithothamnion*, and under ledges is another Nullipore, which I believe to be a *Lithophyllum*. This latter forms thick porous masses, from which there project upwards short calcareous plates.

The Cœlenterata are well represented here. The hydroids *Sertularia*, *Plumularia* and *Aglaophenia* grow on the under side of stones. Three or four species of Alcyonaria occur, two of them being quite common. One is a beautiful greenish-blue organism, *Xenia* sp., while an *Alcyonium* forms rather massive chocolate colonies, resembling a Madreporal coral in form. A *Cornularia* and a *Sarcophyton* are occasionally found, so also is a carmine *Echinogorgia*. The last-named species, as well as a yellow species of the same genus, are commonly washed up on the beach. There are also a few hard corals, including two or three species of *Goniastrea*, a *Pocillopora* sp., *Madrepora* sp., *Cylichia* sp., and a form somewhat resembling *Dendrophyllia*.

There are two species of *Epizoanthus*, one of which is very common. Other anemones also are to be seen.

The sponges are well represented, so also are the Polyclads (*Leptoplana* sp.) Nemerteans and free-living Nematodes occur. Polychaetes are common, including besides Polynoids, Amphinomids and Eunicids, *Heteronereis* and many tubedwellers, e.g., *Spirorbis*, *Spirographis*, *Galeolaria*, *Sabellaria*, *Pectinaria* and *Terebella*. Beautifully coloured Serpulids are to be seen, reminding one of those found in the coral on the Barrier Reef.

The Echinoderms include *Asterina* (like a pale *A. exigua*), *Cocinasterina calamaria*; various Ophiuroids; the Echinoids *Echinometra lucunter* (which is very common) and *Heliocidaris erythrogrammus*; the Holothurians, *Holothuria atra*, which is very common in situations exposed to sunlight, and *Stichopus* spp., especially a brownish-green species, which avoids light.

The Crustacea are represented by prawns, Amphipods, crabs and hermit crabs. The commonest species of the last-named is *Clibanarius viriscens*, while the large red tropical *Dardanus megistos* (*Pagurus punctulatus*) is not uncommon. The commonest crabs are *Leptodius sanguineus* and *L. exaratus*, *Grapsus strigosus*, *Pachygrapsus transversus*, and the swimming crab *Thalamita stimpsoni*.

The mollusca are well represented, the chief bivalves being *Pinctada vulgaris Arca fasciata*, and the mussel *Brachyodontes hirsutus*. The commonest gastropods are *Monodonta zebra*, *Turbo militaris*, *Nerita melanotragus*, *N. albicilla*, *N. plicata*, *Agnewia pseudamygdala*, *Polia undosa*, *Cerithium janellii*, *Xymene margariticola*, *Cypraea* spp., *Thais ambustulatus*, *Strombus luhuanus* and *Scutus anatinus*. There are many others, but they are less common. The octopus is occasionally seen. Amongst the Chitons, one might mention *Ischnochiton fruticosus* and *Ischnoradsia australis*.

Ascidians, both simple and colonial, are fairly common,—e.g., *Styela*, *Sarcobotrylloides*, *Cynthia*, *Ciona*, *Colella*, *Leptoclinum*, etc.

Several species of fish inhabit the rock pools, but the only one so far identified is *Salarias meleagris**. There are also two small banded species, one with the black and silver markings on the body, placed longitudinally, and the other has them transversely arranged.

THE OCEAN SAND BEACH.

The chief denizens are the "ugari," *Donax deltoides*, which is often parasited by a pea-crab *Pinnotheres*, and the "sand worm" *Onuphis* (*Diopatra*) *teres*. The distribution of the latter is very limited here, being found only in the vicinity of the Tooway Creek sandbar. The sand crabs, *Ocyropsis cordimana* and occasionally *O. ceratophthalma*, are to be seen racing over the sand, or disappearing into their spiral burrows. These two species may be encountered amongst the terrestrial vegetation hundreds of yards away from the shore.

Abundant organisms (or their remains) are thrown up on the beach, and attract the attention of sandhoppers (*Orchestia* spp.), and various insects, e.g., flies, Homoptera, Tenebrionid and Staphylinid beetles, etc. Amongst the

* Identified for me by Mr. A. R. McCulloch, Australian Museum, Sydney.

forms washed up, especially after south-east gales, are *Noctiluca*, *Foraminifera*; various Hydroids on sea-weeds, *Thuiaria tubuliformis* (identified by Mr. E. A. Briggs), *Velella*, *Physalia*, *Crambessa mosaica*, and other medusæ; *Cirripathes* spp., *Pleurobrachia* sp; *Echinogorgia* spp., one of which commonly has a symbiotic pecten, *Pteria lata*, and two cirripedes, *Balanus navicula* and *B. cymbiformis*; *Sycon*, *Stelospongia*, *Euspongia*, *Hippospongia*, *Aulena gigantea*, *Chalina*, etc., amongst the sponges, many of them harbouring *Balanus spongicola*, *Acasta glans*, *Acasta sulcata*, and the mollusc *Saxicava australis*; coral skeletons (*Porites*, *Madrepora*, *Goniastrea*, *Turbinaria*) perforated by *Pyrgoma* spp., *Creusia* sp., *Lithotrya* sp. (boring cirripedes), *Lithophaga* (a boring bivalve), and Serpulids; Polyzoa, such as *Flustra*, *Membranipora*, *Electra*, *Retepora*, *Lunulites*, etc.; pumice bearing *Membranipora*, *Lepas anserifera* and sometimes *L. anatifera*, *Amphinome* spp., beautiful large anemones, and occasionally a Madrepore coral, and Algæ, e.g., *Caulerpa nummularia*; heart urchins (*Marelia*, etc.); Cephalopod shells (*Sepia plangon* and *S. mestus*, *Spirula peronii*, and occasionally *Nautilus pompilius*); *Ianthina violacea*; and various sea-weeds, including practically every species found growing on the rocks and on the floor of Bribie Passage, as well as *Codium* spp., *Sargassum flavicans*, *S. stenophyllum*, *Cystophora paniculata* (rarely), *Eklonia exasperata* (uncommon), *Turbinaria* (rarely), *Gracilaria confervoides*, *Hypnæa*, *Amphiroa anceps*, *Galaxaura umbellata*, *Asparagopsis delillei*, *Delisia pulchra*, etc.

Amongst the shell grit on the shore are the shells of a great number of mollusca, many of which live on the rocky beach, while many frequent deeper water, and some, no doubt, inhabit the adjacent Bray rock lying a short distance off Caloundra Head. The commonest molluscs (excluding those which live on the rocky beach) are various species of *Arca*, *Glycimeris australis*, *Natica* spp., *Polinices* spp., *Phasianella variegata*, *Diodora ticaonica* (keyhole "limpet"), *Cypræa*, spp.

The valves of sundry other cirripedes, in addition to those species already mentioned as living on the rocky reef, are to be found, *Balanus imperator* and *B. amaryllis* being common, while *Pyrgoma* sp. is not uncommon.

THE ESTUARY.

The ocean sand beach merges into the estuary, the sand becoming finer and more and more mixed with mud, until the mangrove regions in Bribie Passage are reached; where the shore is, in places, formed of soft mud. Where sand predominates, one meets with *Donax deltoides* and *Polinices*

plumbeus; *Cynthia preputialis* and *Balanus* (? *B. amphitrite*) occur on Caloundra jetty, whose woodwork is attacked by the "cobra" *Nausitoria*. Over the sand flats marches the army crab or "blue bottle crab," *Mycteria longicarpus*. Where the mud becomes more evident, *Pyrasus herculeus* is common. *Zostera nana*—known locally in Bribie Passage as "swan grass," because the black swan, *Chenopsis atrata* is very partial to it there—grows abundantly to constitute a *Zosteretum*. Amongst the ribbon-like leaves of this monocotyledon are to be found the cockles, *Arca trapezia* and *Cardium rugosum*; the local pearl shell, *Pinctada vulgaris*; the mussel, *Brachyodontes hirsutus*; *Mactra*; *Pinna menkei*, with its symbiotic crabs *Pinnotheres* and *Alpheus*; *Arcularia jonasi*, *A. thersites*, etc.; *Cymbium flammeum* (*Melo diadema*); *Strombus campbelli*, *S. luhuanus*; *Polinices plumbeus*; the "ink fish" *Dolabella*; occasional crinoids (*Comatula*), starfish (*Anthenea*, *Oreaster*, etc.), and brittle stars; stinging hydroid colonies; several species of anemones, e.g., *Discosoma* (with a commensal fish, *Amphiprion*), *Cerianthus*, etc.; polychaetes, the commonest of which is a green one some three or four inches in length; and at least two species of pipe fish, the commonest, according to Mr. J. D. Ogilby, being *Corythoichthys altirostris*. In deeper water the *Zosteretum* contains two other monocotyledonous plants in abundance, *Halophila ovata* ("dugong weed") and *Cymodocea ciliata*, as well as, occasionally, a lowly Alga, which I believe to be *Acetabularia calyculus*.

The oyster (*Ostrea cucullata*) flourishes in certain parts of the estuary, but where conditions are too muddy, it is liable to be attacked by the tiny oyster worm, *Polydora* (*Leucodore*) *ciliata*, which is common and at times destructive. The bubble-weed, *Colpomenia sinuosa*, one of the green Algæ, often acts as a transporter of young oysters, thereby denuding the "beds," and is consequently regarded by the oyster grower as a nuisance. The gastropod, *Trophon paviae*, is common, and attacks oysters.

Where mud has more or less completely replaced the sand, one finds mangroves skirting the shore line, the commonest species in this "tidal forest" being the white mangroves, *Avicennia officinalis* ("cobbler's pegs"), and *Aegiceras majus*, red mangroves or "spider legs," *Rhizophora mucronata*, *Bruguiera Rheedei* and *Ceriops Candolleana*.* This zone supports, amongst others, *Drupa marginalba*, *Ostrea cucullata*, *Modiola* sp., *Nerita reticulata*, *Cerithium* spp., *Pyrasus* spp., *Bembicium melanostoma*, *Melaparhe scabra*, a limpet, and *Onchidium*, amongst the molluscs; *Balanus trigonus*; and the crabs *Uca* (*Gelasimus*) *longidigitum*, and at least one other common species.

* I am indebted to the Government Botanist, Mr. C. T. White, for these names.

The lagoon at the entrance of Tooway Creek is really partly estuarine, and contains *Halophila ovata* on its floor, and the gastropods *Melania venustula* and *Pyrazus anguliferus* side by side in the shallow water. Regarding these two molluscs, Mr. Hedley informs me that the former is looked upon as fluviatile and the latter as marine. It is of interest to note that these were taken together, the *Melania* being the more common (January, 1917).

We are now in a position to compare and contrast the littoral fauna and flora of Caloundra and Sydney districts.

There are the same zones, though the dominant organisms differ somewhat. The Littorinids belong to the same species and occupy similar horizons.

There is at Caloundra a great development of *Sargassum* and an absence of such forms as *Cystophora* and *Hormosira banksii*, which are so common in the inter-tidal zone in N.S. Wales. *Eklonia*, which is very commonly found on southern beaches after storms, is quite uncommon here. The dominant cirripede in our district is *Tetraclita rosea*, while *Catophragmus* does not occur. *Cynthia*, though not uncommon, is not a dominant organism here and *Galeolaria* is rather rare, whereas in the Sydney district the latter is a reef-forming animal. *Ulva* occurs in our rocks far less frequently than *Enteromorpha*. *Zostera* is common in both places, but, as far as I am aware, *Posidonia* does not extend as far northward as Queensland.

The Caloundra mollusca, speaking generally, belong to the Australian region, and not to the Indo-Pacific region, i.e., they are of temperate origin, and not from a tropical home. Of course, certain species are of tropical origin, e.g., *Cymbium*, *Strombus*, *Cypræa*, etc., but most of the common species are identical with those found in abundance in the Sydney district. The crabs and hermit crabs are mainly tropical forms, as also are the corals. In regard to the last-named, Mr. Frank Rooke informs me that there is a fine development of corals on the various reefs lying just off Moffat and Caloundra Heads, and we know that they are common in Moreton Bay, in the vicinity of Moreton, Stradbroke and Peel Islands.* Most of the Alcyonaria, Holothuria, and anemones appear to be of northern origin. The commonest echinoid here is *Echinometra*, whereas in Sydney it is *Heliocidaris*.

We come to the conclusion, then, that this portion of Queensland is a meeting ground where the tropical fauna and flora mingle with those of southern origin. In some groups, the former predominates, while in others, it is the latter. On the whole, the southern element is the stronger

* There are several "dead" coral reefs in Moreton Bay, e.g., off the various islands (Peel, Moreton, Stradbroke, etc.), more or less covered by a deposit of mud and sand. There is good reason to believe that the climate of Eastern Australia has altered in recent times, the mean temperature having been lowered. Mr. Hedley has referred to the present range of the mollusc *Arcularia dorsata* as an example. It formerly reached the Hunter estuary but now does not extend south beyond Port Curtis. The change has evidently affected the coral reefs also. The Moreton Bay islands, or rather their small fringing reefs, no doubt marked the southern limit of our Great Barrier Reef.

EULEPIS (CHARAXES) SEMPRONIUS.

By R. Illidge.

READ 29TH MARCH, 1917, WITH EXHIBIT.

Having taken some fine specimens of this butterfly lately, a few notes on the insect may, perhaps, possess some interest.

Our butterfly, *Charaxes sempronius* of Fabricius, is found on the East coast of Australia, from Cape York to Sydney, and it is also known from the Port Darwin and Roper River districts.

The insect, as may be inferred from its robust appearance, is very powerful on the wing. On fine sunny days, it will sail along with scarcely a flap of its wings. It has a habit of flying round on the same beat many times, and thus would lead the novice to imagine the insects were very plentiful. It is fond of settling on the same particular twig time after time, and even if chased away returns. A bad habit the creature has is that of sucking the fermented sap of wounded trees, and thus becoming partly intoxicated. Whilst in this condition, we have frequently captured them with our fingers. I have seen them settle in places where sap is exuding, and push away many other insects, and even wasps of large size are driven off, and Sempronius will snap his wings together as if in glee at their defeat. At the same time, however, as soon as he appears in sight, he is at once attacked by many other butterflies, but these he easily eludes, and always attains his objective.

The food plant of the insect consists of various species of Leguminosæ, such as *Acacia decurrens*, *A. podalyriæ-folia*, etc., also many introduced plants of the same order, as *Robinia*, *Caesalpinia*, *Gleditschia*, etc. It often lays eggs on plants of this order, however, which appear to be unsuitable as food. The eggs and young larvæ may frequently be found on *Poinciana*, but in no case under observation have they lived.

The larva and pupa are well known, and have been described more than once, and the larva is also figured in Oliff's work on Australian Butterflies. The larva feeds mostly at night, and during the day remains quiescent on the upper surface of a leaf, on which it has spun a strong web to secure itself from being blown off during high winds, as it frequents tall trees.

Local specimens are finer than those I have seen from other parts. The largest example shown is $4\frac{7}{8}$ in. in expanse, and occasionally they reach 5 in. The average of the females is $4\frac{1}{2}$ in., and of the males $3\frac{1}{2}$ in.

BOTANIC NOTES,—No. 4.*

By C. T. White, Acting Government Botanist, Brisbane.

The following notes refer mainly to several plants of more than passing interest collected on different excursions of the Club:—

Order Magnoliaceæ.—*Galbulimima baccata*, *Bail.*
Buderim Mt. Only one or two trees seen (F.N.C. Excurs. IV., 1916).

Order Malvaceæ.—*Abutilon auritum*, *G. Don.*, Rosewood (F.N.C. Excurs. V., 1913). This species is plentiful in the scrubs, and forms a handsome flowering shrub of 4.5 ft. Connecting localities between this and the Northern ones recorded in the "Flora Australiensis" and "Queensland Flora" are Mt. Perry (J. Keys)† and Gladstone (C. Hedley).

Order Rhamnaceæ.—*Cryptandra spinescens*, *Sieb.* On our several visits to the Glass House Mts., we have met with this species in fair abundance in rocky exposed situations. This is the only locality for the species represented in the Queensland Herbarium.

Cryptandra longistaminea, *F.v.M.*, Goodna (Brisbane River). F.N.C. Excurs. IX., 1915.

Cocci crustaceous abt. 2 lines long, opening in 2 valves.

Order Leguminosæ.—*Bossia heterophylla*, *Vent.* This is a common species in sandy land along the South Queensland coast; specific localities for it are Moreton Is. (F.N.C. Excurs. IX., 1908), Stradbroke Is. (F.N.C. Excurs. IV., 1917), Maroochydore (F.N.C. Excurs. IV., 1916), Lake Cootharaba (J. Keys).

Daviesia Wyattiana, *Bail.* Stradbroke Island (F.N.C. Excurs. IV., 1917).

Tephrosia Bidwilli, *Benth.* Brisbane River (White and Young).

Acacia amblygona, *A. Cunn.* On our excursion to Goodna in Sept., 1915, we found this *Acacia* fairly common in the forest country. Eidsvold (Dr. T. L. Bancroft); Miles (Miss E. J. Adams); and Chinchilla (Miss Edna Clark) are localities worth recording for the species.

Order Myrtaceæ. *Myrtus tenuifolia*, *Sm.* var. *latifolia*, *Maid. and Betch.* In the "Queensland Naturalist," Vol. 2, p. 22, I drew attention to a glabrescent form of *M. tenuifolia* from the Blackall Range. On our recent visit to Myora, this shrub was very common in the forest country, and showed great variability in the degree of pubescence of the under-surface of the leaves—the older ones being quite glabrous on both sides, and on looking through the material in the Queensland Herbarium this variability can be seen in the

* No. 3. Queensland Naturalist—Vol. 2. pp 21-23.

† *Bail. Proc. Royal Socy. Qld.* Vol. 1. p 62

numerous specimens, ranging from hoary white to slightly paler, but quite glabrous on the under surface. Maiden and Bêche (Census of N.S.W. Plants) designate the northern plant as *var. latifolia*, but do not mention the variability here referred to. On Stradbroke, it is locally known as "Midgen."

Order Labiatæ.—*Teucrium corymbosum*, *R.Br.* In the report on the Botany of the Excursion to Tamborine Mt. in "Queensland Naturalist," Vol. 2, p. 23, following the indication of the "Queensland Flora," I stated this was only previously known in Queensland from Killarney. On looking up the matter, I find it had already been recorded as a common weed on Tamborine Mt., by Scortechini (Proc. Linn. Soc. N.S.W., Vol. 6, p. 166).

Order Urticacæ.—*Ficus stenocarpa*, *F.v.M. herb.*, Benth. Fl. Austr. VI. 174, Bail., Queens, Fl., p. 1475, Maid., Proc. Linn. Soc., N.S.W., 3 n.s. 1314; *F. aspera*, Forst, *var. subglabra*, Benth. Fl. Austr. VI. 175; *F. subglabra*, *F.v.M. Fragm. IX. 152*, Bail., Queens., Fl. p. 1476.

This interesting fig is rather rare about Brisbane; when growing in the open it makes a small nicely-shaped tree.

Additional habitat records for it are Percy Islands (H. Tryon); Kin Kin (Francis and White); Burleigh Hds (Coll. ?).

Order Cyperacæ.—*Cyperus tetraphyllus*, *R.Br.* This species has been collected at the following localities visited by the Club:—Pine River, Buderim Mt., Palmwoods, Rosewood, Coomera River and Tambourine Mt. I have also collected it at Kin Kin and on the Blackall Range. It is very common in all the scrubs of south-eastern Queensland.

Cyperus pilosus, *Vahl.* This species is commonly met with on our excursions about Brisbane. The following habitat records extend our knowledge of its range in Queensland:—Kin Kin (C.T.W.), Budcrim Mt. (F.N.C. Excurs., April, 1916); Eumundi (C.T.W.); Mudgeeraba (C.T.W.); Johnstone River (Rev. N. Michael).

Elynanthus capillaceus, *Benth.* Glass House Mts. These specimens collected on our excursion to the above locality in Sept., 1909, represent a similar growth to the Bellenden Ker specimens referred to by Bailey ("Queensland Flora," p. 1788).

Order Graminæ. *Chamaeraphis paradoxa*, *Poir.* Common in the swamps on Stradbroke Is. I have noticed this grass several times on Stradbroke, but could not identify it with certainty until collecting flowering specimens on the Club's recent visit to Myora.

Elionurus citreus, *Munro.* This grass is common about Myora (Stradbroke Island).

BRIEF REPORT ON THE BOTANY OF THE EXCURSION
TO BUDERIM MOUNTAIN, EASTER, 1916.

The Club has paid four visits to Buderim Mt. On three of these, it has been my pleasure to be present; the locality is an extremely interesting one botanically, within easy distance being found several distinct types of plant-associations. All "scrub" (rain-forest) has, practically speaking, been cleared from the mountain, but still a fair amount remains in the gullies along the different creeks. On our last excursion, a couple of visits were paid to the coast, and the country between Moolcolah Hds and Maroochydore was fairly well worked. Quite a number of interesting plants were gathered, in addition to those listed in the "Queensland Naturalist," Vol. 1, pp. 256-261. *Eugenia cyanocarpa* and *Cyperus laevigatus*, two species collected, proved new records for the State. Owing to exigencies of space, a list of the species collected is not given, but the more interesting ones are noticed in various papers.—C. T. White.

REPORT ON THE BOTANY OF EXCURSION TO MYORA
STRADBROKE ISLAND (EASTER, 1917).

From the botanical point of view, this excursion must be regarded as exceedingly profitable. The locality would be an excellent one for the study of plant ecology, several distinct types of plant-associations being in evidence. One of the most interesting is the "Turf Moss" formation (so designated by Domin), consisting largely of Cyperaceæ and Restiaceæ, with a good number of flowering shrubs; an Epacrideous plant characteristic of this formation is *Sprengelia Ponceletia*, the solitary flowers, white or pinkish, and placed at the end of the branches, make this a distinctive plant, and the flowers dotted all over the swamp make it very characteristic of the formation. In the more swampy parts was a great quantity of the Citron Scented Tea Tree (*Leptospermum Liversidgei*), which occurs in such quantities that it should prove profitable for collecting for oil distillation. *Agonis Scortechiniana* is another Myrtaceous shrub, very common in such situations on the northern end of Stradbroke. All around the edge of this turf moss (*Sphagnum*) formation and around the edge of the swamps, *Eucalyptus robusta* is very common. Of Utricularias in the wetter situations, *U. cvaneæ* and *U. lateriflora* were gathered.

In the forest country around the camp the principal trees were:—*Eucalyptus* of six (6) species, *E. tereticornis*, *resinifera*, *Planchoniana*, *hæmastoma*, *corymbosa* and *pilularis*

(but strange to say, no *E. tessellaris*), *Angophora lanceolata*, *Tristania conferta*, *Casuarina suberosa* and *C. torulosa*, the Cypress Pine (*Callitris columellaris*), *Banksia integrifolia* and *B. aemula*. *Monotoca elliptica* (?), *Leucopogon margarodes* and *Ricinocarpus pinifolius* made small trees. The Grass Tree (*Xanthorrhæa*) is common. Among interesting shrubs collected were *Homoranthus virgatus*, *Daviesia Wyattiana*, and *Myrtus tenuifolia* var. *latifolia*. *Hibbertia linearis* var. *floribunda* was very common; it forms an upright branching under-shrub of about 3ft., and was in flower at the time of our visit.

A most interesting type of plant-association was what might be termed a true "scrub," consisting mainly of *Eucalypts* (especially *E. Planchoniana*, *resinifera*, *corymbosa* and *hæmastoma*) of shrubby growth, the average height, I should say, being about 8-10 ft. This peculiar formation covered a very large extent of country, and it is my hope in the near future to botanise over it rather carefully. Associated as undergrowth with the *Eucalypts* were various species of xerophilous, prickly species of *Proteaceæ*, *Leguminosæ*, *Epacrideæ*, etc. The stunted growth of these *Eucalypts* is, no doubt, due to the poorness of the soil, as a short distance away, in the open forest, the same species may be seen as fair-sized trees.

A brief account of the Flora of Stradbroke Island was given by F. M. Bailey, in Proc. Linn. Soc. of N.S.W., Vol. 6, p. 139.—C. T. White.

NOTE ON CLIMBING HABITS OF A SNAKE.

By H. A. Longman, Queensland Museum.

On March 12th, 1917, a young specimen of the common fresh-water snake, *Natrix picturatus*, Schleg., just over eight inches long, was seen climbing up the vertical glass side of a vivarium in the Queensland Museum. It was able to climb right away from the floor, and to support itself entirely on the glass, which was wet with moisture at the time. The ventral shields, or gastrosteges, were so disposed as to form suction areas, and the snake apparently had no difficulty in remaining in the one position for several seconds. But for the closed lid of the vivarium it would certainly have escaped. The agility of these young snakes is so remarkable that it is not surprising that they are occasionally found coming out of city drains. In Brisbane recently, a young water-snake, only a few inches long, was found inside a motor car. The genus was once commonly known as *Tropidonotus*, Kuhl (1822) but *Natrix*, Laurenti (1768), has more legitimate claims.

A NOTE ON SOME FRESHWATER RHIZOPODA FROM
STRADBROKE ISLAND, MORETON BAY.

By C. D. Gillies, M.Sc., University, Brisbane.

During the Easter trip, 1917, of the Field Naturalists' Club to Myora, Stradbroke Is., I obtained some squeezings of wet Sphagnum, and a sample of sediment from a stagnant pool, for the examination of Freshwater Rhizopoda. The material was preserved in weak formalin, by adding a few drops of the strong preservative to the contents of each tube. I have found that alcohol and mixtures of alcohol and formalin, such as Kofoed's Plankton fluid (70 per cent. alcohol 98 parts, strong formalin 2 parts) are unsuitable media for subsequent microscopical examination of the material, on account of the formation of currents.

There are two accepted classifications of the Freshwater Rhizopoda. Some prominent authorities divide the subclass into two orders, viz., Conchulina and Ameobina, according to the presence or absence of a test; others regard the character of the pseudopodia as being more satisfactory, and group those with long, pointed pseudopodia into the order Filosa, while forms with blunt, rounded ones comprise the order Lobosa. *Diffugiella*, a genus described by Cash in 1904, is an intermediate form between the Filosa and Lobosa on account of the possession of pseudopodia of both kinds. Twenty-one species were identified, all of which except *Sphenoderia dentata*, Pen., were present in the Sphagnum material, but only seven were observed from the stagnant water, these being indicated below by an asterisk (*).

The following is a list of the species identified:—

Phylum PROTOZOA.

Class SARCODINA.

Sub-class RHIZOPODA.

ORDER LOBOSA.

1. *Arcella discoides*, Ehrenb.
2. *Arcella gibbosa*, Pen.
3. **Centropyxis aculeata* (Ehrenb) Stein.
4. *Diffugia acuminata*, Ehrenb.
5. *Nebela barbata*, Leidy.
6. *Nebela caudata*, Leidy.
7. *Nebela collaris* (Ehrenb) Leidy.
8. *Nebela tubulata*, Brown.
9. *Quadrullella symmetrica* (Wallich) Cockerell.

ORDER FILOSA.

10. *Assulina seminulum*, Leidy.
11. **Corythion dubium*, Taranek.
12. *Euglypha ciliata*, (Ehrenb) Leidy.
13. *Euglypha compressa*, Carter.
14. *Euglypha cristata*, Leidy.
15. *Euglypha strigosa* (Ehren) Leidy.
16. **Euglypha tuberculata*, Duj.
17. *Hyalosphenia platystoma*, West.
18. *Placocysta* sp.
19. **Trinema complanatum*, Pen.
20. **Trinema lineare*, Pen.
21. **Sphenoderia dentata*, Pen.
22. *Sphenoderia lenta*, Schlumb.

Hyalosphenia platystoma, West, *Nebela barbata*, Leidy, *Nebela tubulata*, Brown, *Sphenoderia dentata*, Pen, *Sphenoderia lenta*, Schlumb, and *Trinema lineare*, Pen, I believe to be new records for Queensland.

Centropyxis aculeata (Ehren) Stein, and *Euglypha cristata*, Leidy, have been recorded previously from Bribie Is. (Gillies Proc. Roy. Soc. Queens. XXVII., 1915, p. 100).

REMARKS ON SOME OF THE SPECIES.

ORDER LOBOSA.

Arcella.—It is noteworthy that *Arcella vulgaris*, Ehrenb., was absent in both gatherings, yet in the material collected on Bribie Is. in 1915, this form was abundant.

Centropyxis aculeata (Ehren) Stein.—In the forms met with the number of spines on the test varied from two to eight.

Nebela barbata, Leidy.—The recording of this species for Queensland is not without interest. Though it has been known for about forty years, Wailes (Proc. Linn. Soc. XXXII.) gave its known distribution, up to 1912, as U.S.A., British Isles, and Sierra Leone. The presence of the "cils" arising from various parts of the test is very characteristic, but for a time their nature was not understood, as they were regarded as parasitic outgrowths. One specimen showed a decided curvature in the long axis of the test.

Nebela caudata, Leidy.—This interesting form has been recorded already for this State from Eumundi, by Penard (British Antarctic Expedition 1907-9 Reports "Rhizopodes d'eau douce, p. 216."). In the only specimen observed, four spines were present, three of which were broken.

Nebela collaris (Ehren) Leidy.—In nearly every drop of sphagnum water examined, at least one specimen of this species was observed. A slight neck was constantly present, and the margin of the mouth was dentate, crenulate, irregular or entire.

Quadrullella symmetrica (Wallich) Cock.—I have followed Cockerill, who records this genus as *Quadrullella*, instead of *Quadrula*, which is pre-occupied in the Mollusca. I observed one specimen in the stagnant water. This is unusual, and the only other Queensland locality where I have obtained stagnant water in which it occurred, is the Springbrook Plateau. In all the specimens examined, a distinct neck was present, approximately equal to half the length of the test.

ORDER FILOSA.

Corythion dubium, Taranek.—Not uncommon, but only one damaged specimen was met with in the stagnant water.

Euglypha cristata, Leidy.—This rhizopod occurred not uncommonly in material I obtained from Bribie Is. in 1915. Up to the present I have observed only one specimen in the Stradbroke Is. gatherings.

Euglypha tuberculata, Duj.—Wailles in "British Fresh-water Rhizopoda and Heliozoa," Vol. III., believes that the form described and figured by Leidy under the name *Euglypha alveolata*, Duj., consists of two distinct species, to which he has applied the names *Euglypha tuberculata*, Duj., and *Euglypha acanthophora*, Per, the former including the unspined forms, and the latter the spined. As all the *alveolata* type were unspined, I have called them *Euglypha tuberculata*, Duj.

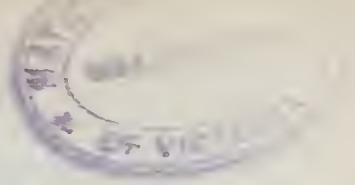
Hyalosphenia platystoma, West.—One small *Hyalosphenia* was seen, which appeared to be identical with the form described and figured by West (Journ. Linn. Soc. 1903), as *Hyalosphenia platystoma*, West.

Sphenoderia dentata, Pen.—Only one specimen was observed, and it was found in the stagnant water material. There was a number of scales inside the animal, similar to those which occur in *Euglypha*.

Placocysta sp.—An unidentified specimen was observed, which appeared to be a *Placocysta*, as the test was typical, and the mouth entire. Instead of being spined in the manner characteristic of *Placocysta spinosa*, Leidy, it had only three or four spines arranged around the fundus, like those of *Euglypha acanthophora*, Per.

Sphenoderia lenta, Schlumb.—This species was common in the sphagnum material. In all the specimens met with, the test was globular, and there was little variation in shape.

Trinema lineare, Pen.—In the stagnant water two tests were observed applied mouth to mouth. Evidently in the act of conjugation, the animals had been killed, but owing to the presence of some cementing material the tests remained attached. *Trinema lineare* is more frequently seen than *T. complanatum*, Pen., but neither is rare.



The Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES.

VOL. II.

JULY, 1920.

No. 3.

FOREWORD.

To members of the Queensland Field Naturalists' Club, who are aware of the difficulties of the past few years, no apology is needed for the non-appearance of the *Queensland Naturalist* since April of 1917. Nor should it be necessary to tender detailed explanations to other readers; it will be sufficient, perhaps, to assure them that the general activities of the Club have in no wise been neglected, and that it is hoped future circumstances will permit the regular production of this little journal.

That the *Queensland Naturalist* fills a definite niche cannot be doubted. It is the only journal of its kind published in a State which is, from a natural history viewpoint—and particularly in respect of botany, ornithology, and entomology—probably the richest field in the whole of Australia. The right of visitors from the Southern States and from other countries to join in the scientific and semi-scientific exploitation of this field is conceded with cheerfulness, but this does not alter the fact that there is a call to Queenslanders to develop their own æsthetic and kindred resources, and to publish the results in their own State, for the general good.

Members of the Club have already done much valuable work of the kind, both individually and collectively, some of which has been recorded in past issues of the *Naturalist*. In the intervening years excursions have been continued, and the results of these frequent trips have been communicated at meetings. Some of these results have been

important. For instance, the 1918-19 trip of members to the Macpherson Range was the means of revealing several new plants and, more unusual still, two birds new to science. The latter have since been described in the pages of the *Emu** under the names of *Atrichornis rufescens jacksoni* (Rufous Scrub Bird) and *Pachycephala olivacea macphersonianus* (Northern Olive Whistler). It is hoped later on to obtain further notes from this most interesting locality, and to publish the combined observations of members in a special issue of the *Naturalist*.

The visit in question was of further value in that it led to the Government appointing Mr. E. M. O'Reilly as salaried ranger for the great National Park of the Macpherson Range. With a similar object—the preservation of native fauna and flora—the Club joined with the Royal Australasian Ornithologists' Union in a successful effort to have better protection afforded the birds and plants of the Bunya Range, which locality was visited by a large party of naturalists in October of 1919. Furthermore, the Club has frequently initiated or joined in movements for the better protection of particular birds and animals, and at time of writing is endeavouring to safeguard the native Opossums, which appear to be in grave danger from the fur trade.

A brief résumé of meetings and excursions follows.

PROCEEDINGS.

SEPTEMBER, 1917 TO JUNE, 1920.

SEPTEMBER 27, 1917—Wild Flower Show. About £4 collected and handed over to Queensland Patriotic Fund.

FEBRUARY 22, 1918—Annual Meeting. Address by retiring president. Mr. W. R. Colledge: "Notes on *Lophobus brisbanensis*, a new member of the Polyzoa."

EASTER, 1918—Visit to Montville (Blackall Range).

APRIL 25, 1918—Visit to Ipswich. Trip organised by Mr. Henry Tryon. Taken over the Blackheath Colliery by Mr. W. E. Laurie, General Mines Manager. In the afternoon brief visit to City Quarries in search of fossil

*Vol. 19, pp. 258-273.

plants and insects. *Evening* (7 to 10)—Lectures (1) by Mr. Laurie: "Coal, with special reference to the coals of the Brisbane district." (2) By Mr. R. A. Wearne, B.Sc.: "The Physiography and Geology of the West Moreton District." (3) By Mr. A. H. Chisholm: "Birds of South Queensland."

MAY 1, 1918—Lecture by Mr. W. H. Dudley Le Souef (Melbourne): "Some Australian Birds and Reptiles."

AUGUST 20, 1918—Visit to Queensland Museum. Afternoon tea provided by Mr. and Mrs. H. A. Longman.

SEPTEMBER 16, 1918—Mr. T. Steele, editor of the *Australian Naturalist* (Sydney) conveyed greetings and good wishes from the New South Wales Club.

SEPTEMBER, 1918—Conversazione and Wild Flower Show. Proceeds (about £7) handed over to the War Nurses Fund.

OCTOBER, 1918—Visit to Darra Cement Works. Trip organised by Mr. H. Tryon. Taken over the works by the Manager, Mr. G. E. Drewitt. A brief lecturette by Mr. A. Morry: "History of the Cement Industry in Queensland." The trip was worked in conjunction with the mining and engineering classes of the Ipswich Technical College.

OCTOBER 21, 1918—Lecture by the President (Mr. C. T. White, Government Botanist): "A Botanical Collecting Trip to Papua."

NOVEMBER 9, 1918—Microscopical evening.

DECEMBER 9, 1918—Lecture by Mr. Tryon (Government Entomologist): "Insects Parasitic on Other Insects, especially with reference to their economic value."

CHRISTMAS TO NEW YEAR, 1918-19—Visit to National Park, Macpherson Range.

FEBRUARY 17, 1919—Annual Meeting. Address by the retiring President (Mr. C. T. White): "The Eucalypts of the Brisbane District."

MARCH 10, 1919—Meeting devoted to the National Park. Lecturettes: (1) Mr. H. Tryon, on the History of the Park. (2) Mr. A. H. Chisholm, on the Birds; and (3) Mr. C. T. White, on the Botany. A series of general lantern views by Mr. R. Higgins was shown.

EASTER, 1919—Visit to Burleigh Heads.

SEPTEMBER 15, 1919—Wild Flower Show and Conversazione.

SEPTEMBER, 1919—Entertained visiting members of the R.A.O.U. at outing to Enoggera.

OCTOBER 19, 1919—Lecture by Mr. H. E. Finckh on "Aquaria." Many excellent lantern slides screened of aquaria and their inhabitants, including a number of native fish.

OCTOBER 20, 1919—Lecture by Mr. W. H. Dudley Le Souef: "Birds of the Southern Seas."

1920—During the current year different meetings have been devoted to special subjects, and a system has been instituted under which exhibits relating to a paper are inspected after the reading, instead of at the conclusion of the business. Lectures have been given as follows:—March: "Vegetation of South-Eastern Queensland," Mr. C. T. White; April: "Birds of the Southport District," Mr. G. H. Barker; May: "Reptiles of Australia," Mr. H. A. Longman; June: "Form and Colouration among Insects," Mr. R. Illidge. Excursions have been held to Samford (March), Southport (Easter), Mount Glorious (May), and Goodna (June).

The hon. secretaries of the Club have been—Messrs. C. T. White (1917), H. W. Hermann (1918-19), and H. L. Pottenger (1920). The lastnamed retired in June, and a successor will shortly be appointed. Mr. C. D. Gillies, immediate ex-President, left for Melbourne early in the year, and has since been appointed the Club's representative in Victoria.

TRANSACTIONS.

THE STORY OF A LITTLE FLY.*

By W. R. COLLEDGE.

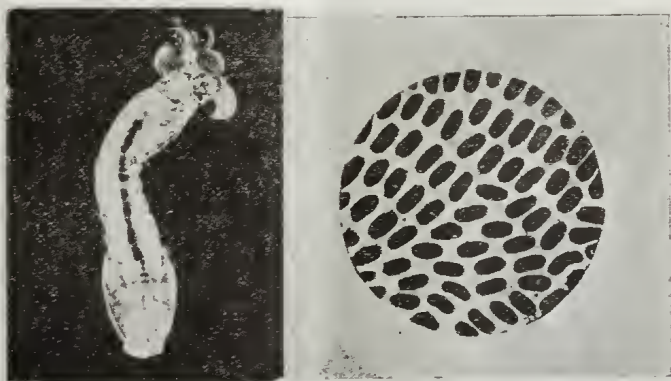
Facts are sometimes stranger than fiction. Evidence of this may be found in our creeks. Just where the water rushes most rapidly, leaving lines of bubbling foam, the unexpected may be found in the shape of a little *Simulium* fly.

Little larger than a midge, it actually chooses this part of wildly rushing water for the purpose of depositing its tiny eggs. Dipping its abdomen below the surface, near the edge of the water, it deposits on a submerged leaf or stone a number of regularly laid eggs, which are attached by a

* *Simulium* sp.; a Queensland member of a large and well-distributed genus. In America a species causes trouble among birds, and in Europe another variety is charged with damage to cattle. The species under review is fairly common in South Queensland; it was first recorded on a Field Naturalists' Club excursion a few years ago.—Eds.

waterproof cement to keep them in position. In genial weather, after a few days, there rises from each a creature in shape not unlike an Indian club. The head is at the tip of the handle, and the swollen rounded part is the body. The slightly tapering base is made up of powerful muscles, by which it can cling to a branch or stone. As a help, around the inner portion a couple of rows of short, strong spines are placed opposite to each other. These can be inserted in a crevice or inequality or on a branch or stone, so as to maintain a firm foothold against an opposing force. The only limb it possesses is a short retractile pro leg situated on the thorax; but, like a Yankee tool, it is adaptable to all

SIMULIUM FLY.



Larvæ (x 10 .

Eggs (x 8½).

sorts of work. The end is armed with a circle of hooks, which can be withdrawn into the interior or thrust out at any angle.

Almost as soon as born the little creature boldly pushes its way into deeper water, after the manner of a leech, disregarding the most powerful current. Should it happen to be caught napping and be torn into the stream, it takes the precaution of fixing a line to its foothold, and on this it soon climbs back to sure ground.

Here it leads the life of a fisher. With the base attached firmly, the body lies in the line of the current, and it unfolds two semicircular nets attached to either side of the head; these are like an umbrella, and as the current sweeps through the under side little worms, water fleas, &c., are caught by the ribs and fibres. Now and then the ribs

close up and the catch is compressed into a ball, which is held by the closing nets in front of the mouth. Then the pro leg, acting as a piston, packs it into the mouth, and it passes down into the stomach.

The larva industriously pursues this occupation for a while. Then some prevision of a future seems to dawn on its consciousness. Alongside of the digestive organ lie two cement glands, and drawing upon their contents it constructs a little hut, just big enough to cover its body. Lying down on its back, the hooked hand draws out a thread, fixing the end on the leaf or other resting place; the thread is drawn across the case and attached on the other side. Repeating this process backwards and forwards, there is ultimately a mummy case firmly cemented on its support.



Pupa Case (x 10).

Mature Insect (Bred from Pupa).

This work done, it is transformed into a pupa, which leads a resting life, while the transformation into a flying insect is going on.

From the upper end eight blind tracted tubes hang. They abstract the oxygen dissolved in the water, and convey it to the insect that is being shaped in the case. In a few days it is complete, and the problem of passing safely through the whirling stream to the air is solved in a most ingenious but simple manner. The matured insect does not require so much oxygen as it did when growing, and the surplus collects in the pupa case. This is distended by the pressure of the gas and the movements of the insect until the pressure bursts the upper portion. The gas does not rise at once, but collects around the insect, whose legs and body offer many points of attraction.

Gradually the bubble enlarges until it breaks away, carrying the enclosed insect to the surface. Once there it clings to a floating leaf or overhanging blade of grass, and thus reaches its own aerial home.

NOTES ON TWO BUTTERFLIES OF THE GENUS *DELIAS*.

By R. ILLIDGE.

(Read 18th August, 1919.)

Delias nigrina (Fabr).—This is one of our commonest butterflies and an exceedingly pretty species. It is found around Brisbane, almost throughout the year, in more or less abundance. I have bred some hundreds of specimens for the purpose of obtaining varieties, but hitherto without success. There is sometimes a slight variation on the upper side, but inappreciable except on close observation. The male, on the under side, is easily distinguishable from the female by the smaller size of the apical band of yellow spots on the fore wing, and on the hind wing by the attenuation of the red band.

Delias argenthona (Fabr) form *seminigra* (Frühstorfer)—Having again bred a small series of this form of *D. argenthona*, I am now enabled to exhibit them along with specimens of typical *argenthona* of Fabr., which were bred in December, those of *seminigra* having been reared in the last week of June. Thus you now see the true summer and winter forms of this butterfly. In connection with *seminigra* the male is also shown for the first time, Frühstorfer being unacquainted with it. It was also unknown to Waterhouse and Lyell, the authors of *The Butterflies of Australia*, and a few days ago I had the pleasure of presenting males to Mr. Waterhouse. In *D. argenthona*, the summer form, the basal yellow of the hind wing is very broad, as are also the submarginal scarlet spots, whereas in *D. seminigra* the yellow is very much dusted with black; the discal area of black is extensive, and the scarlet spots are much smaller. As regards appearance, I consider the winter insect neater than, though not as showy as, its summer relative.

TWO INTERESTING FUNGI.

By C. T. WHITE, F.L.S., Government Botanist.

No group of fungi possesses more brilliant colouring or shapes more bizarre and at the same time beautiful, than that known as the *Phalloidea* (Phalloids). Owing to the great variability or, rather, perhaps, what is considered the great variability of the species, the distinctions between many of the named sorts are not at all clear. In a like manner, the genera generally accepted are not in all cases clearly defined, so that intermediates often occur which are difficult to place generically. Thus, the plants we have under review have at different times been placed under the genera *Lysurus*, *Colas* and *Mutinus*.

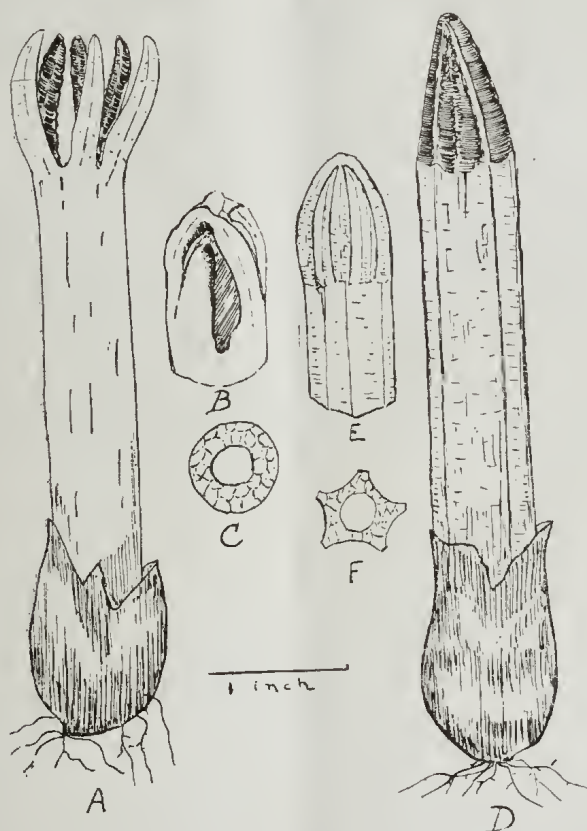
A not uncommon form in Southern Queensland is the species named by the late F. M. Bailey as *Mutinus pentagonus*. This has been united by Cleland and Cheel, the well-known students of Australian mycology, with *L. Gardneri*—a conclusion in which, however, I cannot agree, as the distinctions, in this case at least, between the two plants appear to me very well marked and distinct. But at the same time I think that Bailey's species, by its possession of definite receptacle arms, is undoubtedly a *Lysurus*, and I propose the name of *L. pentagonus* for it. The distinctions between the two forms appear to be as follows:—

Stem cylindrical, white, arms free or rarely two united (*L. Gardneri*).

Stem distinctly angled, pink or red arms united at the top (*L. pentagonus*).

Both species have appeared a good deal in literature, the principal references being:—***Lysurus Gardneri*** Berkeley in Hook. Lond. Journ. Bot. V. (1846) 535, Tab. 17, fig. 2; Lloyd. Myc. Notes 31, p. 407, fig. 243 (an excellent series of photographs); "Synopsis of the Known Phalloids" (1909) p. 37 figs. 38 and 38a; Cleland and Cheel, Proc. Roy. Soc. N.S.W. XLIX. (1915) 204 p. 1, 24 fig. b; *L. australiensis* Cooke and Massee in Grevillea XVIII. (1889) 6; Cooke Handb. Aus. Fungi (1892) 216 pl. 4 fig. 102; Saccardo Sylloge Fungorum IX. 264; Cheel Proc. Linn. Soc. XXXVIII. (1913) 308; Lloyd Phalloids of Austr. (1907) p. 14 fig. 13; "Synopsis of the Known Phalloids" (1909) p. 38 fig. 39; Bailey Compreh. Cat. Queens. Plants (1913) p. 745, fig. 808; *L. tenuis* Bailey in Queens. Agric. Journ. XXVII. (1911) 306 (with a text

fig.) ; Compreh. Cat. Queens. Plants p. 745 fig. 809; *Colus Gardneri* Ed. Fischer in Sacc. Sylloge Fungorum VII. 21; Petch. in Ann. Roy. Bot. Gard. Peradeniya IV. p. 168, pl. 14 (on excellent photogravure), and vol. V., p. 15.



A—C: *Lysurus Gardneri*. A—Whole plant. B—Receptacle of specimen (unusual), with two of the arms united at the tips (after photograph by Cleland & Cheel. C—Section of the stem.

D—F: *Lysurus pentagonus*. D—Whole plant. E—Receptacle arms cleaned of the gleba, showing how they are all united at the top. F—Section of the stem.

(All reduced to the same scale).

Distribution.—Has been recorded from England, Ceylon, and Australia, and, as these places are geographically so wide apart, intermediate localities no doubt remain to be recorded. It is also probable that, when better understood, more than one species will be found to be included

under *L. Gardneri*, in the wide sense in which this species is now taken. In Australia it is confined, so far as known, to New South Wales and Southern Queensland.

Lysurus pentagonus (Bail.) C. T. White n. comb. *Mutinus pentagonus* Bailey Bot. Bull. Dept. Agric. Brisbane X. (1895) 35 (with a fig.); Lloyd Phalloids of Australia (1907) p. 10 fig. 11; "Synopsis of the Known Phalloids" (1909) p. 30 fig. 28; *M. pentagonus* var. *Hardyi* Bailey in Queens. Agric. Journ. XVI. (1906) 494 pl. 29; *M. Hardyi* Bailey Compreh. Cat. Queens. Plants p. 746 fig. 810.

This, in my opinion, is one of the most valid and well-marked species of the genus. Judging from the large numbers of illustrations published by Lloyd in his various papers, the species in general appearance seems to approach most closely to *L. Mokusin* (Cibot) Fries of Japan.

Distribution.—So far as known, confined to South-Eastern Queensland.

Acknowledgement.—To Prof. A. J. Ewart, of Melbourne, my thanks are due for kindly sending me, on loan, copies of the "*Annals of the Royal Botanic Gardens Peradeniya*," containing Petch's valuable papers on the *Phalloideae* of Ceylon.

A NEW FOSSIL PLANT.

By JOHN SHIRLEY, D.Sc.

Nocgerathiopsis Tryoni.

Fronde simplici, longissima, speciosa, obovato-elongata. lateralibus inaequalibus, longitudinaliter striatis, basi attenuata, 175 x 15-40 m.m.; rhacide valida, lineata; nervis secundariis parallelis, tenerrimis, simplicis.

Fronde simple, elongated, of graceful outline, obovate—elongate, unequally divided by the mid-rib, longitudinally striate, 175 by 15-40 m.m.; mid-rib strong, grooved; secondary veins parallel with the mid-rib, slender, simple.

Differs from *N. Hislopi* (Feist) and *N. prisca* (Feist) in the possession of a mid-rib, and from *N. media* (Dana) in shape.

Hab.—Petrie's Quarry, near Brisbane. (F.N.C. Excursion, June, 1918).

Other specimens collected on the same excursion were:—*Thiunfeldia lancifolia* (Morris); *Cladophlebis australis* (Morris); *Pterophyllum multilineatum* (Shirley); *Otozomites* sp.; *Gingho bidens* (Shirley); *G. Simmondsii* (Shirley).

COURTSHIP AMONG BIRDS.

By A. H. CHISHOLM.

The varied methods of courtship among birds is one of great fascination, and concerning which many interesting theories have been advanced. Certainly, the two main factors availed of by the fair sex (in this case the masculine gender) are beauty of plumage and (or) voice, but there are famous instances in which either or both of these factors are stressed by remarkable antics on the part of the male bird—sometimes, indeed, the deportment is more pronounced than the “display.”

In the opinion of Sir Ray Lankester, who has made a somewhat close study of the subject, the fascination of the female bird in such cases is akin to hypnotism among human beings. The same scientist holds that it is not correct to say that a male bird makes these displays *for the purpose* of fascinating the female. In his opinion, the bird merely “finds itself provided with fine feathers, and has probably a brief conscious pleasure in the fact, just as it has in singing, but it has, of course, no control over the growth of its feathers, nor conscious purpose in their production. Similarly, it has no knowledge or consciousness of a purpose in the antics of ‘display,’ nor in singing its melodious song, though certainly it is gratified and has pleasurable sensations in the instinctive performances it finds itself going through.”

It is easy to agree with Professor Lankester that the bird has no control over the growth of its feathers, but not so easy to accept his dictum that this warm-blooded creature has no consciousness of a purpose in its antics or voicefulness. Think of the dancing of the male Lyre Birds, Bower Birds, and Scrub Birds (*Atrichornis*)! Think of the varied songs of pleasure and sorrow, appeal and challenge, common among birds! This aside, however, what would Sir Ray Lankester—or even the great Fabre—say to instances of gifts being bestowed by certain male birds

which are in themselves both handsome and sweet-voiced, and have therefore no instinctive need to adopt such a method of winning feminine favour? In this regard I think particularly of remarkable instances given me by Messrs. W. G. and R. C. Harvey and Mr. J. O'Neil Brennan concerning the Koel (*Eudynamis cyanocephala*) and the Orange-backed Wren (*Malurus melanocephalus*) respectively.

The Harvey brothers, after stating that the Koel returns to their district (Mackay, North Queensland) from

FEMALE KOEL CUCKOO.



This bird, being pursued by friar-birds, took refuge in a garden near Mackay, where she suffered herself to be caught and photographed rather than face the angry "leatherheads."

[Photo by W. G. & R. C. Harvey]

the North about the middle of September of each year, remark that odd birds may be heard "cooeing" for mates in apparently a most disconsolate manner—a habit that has earned for the species the name of "Cooee Bird." "When the male bird is courting a female," they add, "he will seek all sorts of gaily-coloured flower-petals and other articles, which he presents to her in a most elegant manner. The female, in truly feminine fashion, assumes an air of languid indifference, but with a keen eye to business nevertheless."

Bearing on this note, Mr. Brenan, writing from Toowong (which suburb, by the way, was named after another call of the male Koel) sends the following story:— "A few years ago I witnessed a similar performance to that chronicled by the Messrs. Harvey, the central figure being one of the Wrens. While sitting at my window on a Saturday afternoon I heard the continuous notes of the bird, and, looking out, saw three of the orange-backed variety approaching along the top of a fence. One was a male in full plumage, more brilliant, it struck me, than I had ever previously noticed. He was accompanied by two plain brown birds, both females. To one of them the handsome little fellow was paying most marked attention, dancing around her and twittering all the time. They moved along opposite the window, when they came abreast of a red canna in full bloom, about 6 feet inside the fence. Suddenly, the male bird flew from the fence into the centre of one of the canna blooms, plucked a petal, and flew back to the fence, there continuing his flirtation—dancing around the little lady and, so to speak, waving the flower-petal in front of her.

"The petal was quite as big as his whole body, but he carried it in an upright position by the stem. The other little brown Wren was not taken the slightest notice of—possibly she may have been the prospective mother-in-law or an old maiden sister! Just then the house cat appeared upon the scene, and so the birds retreated. The little fellow, however, kept up his attentions, and as they disappeared from view about a hundred yards away was still dancing around with the flower-petal in his beak."

Should we ascribe such instances as these to mere animal impulse or to conscious affection?—remembering that they upset Sir Ray Lankester's theory that "birds which use extraneous decorative objects as lures are themselves of dull plumage," and, moreover, that the gifts selected in each case were of a bright colour, and apparently chosen deliberately for a conscious purpose.



RHOPALOCERA OF SOUTH QUEENSLAND.

(Notes on Seasonal Forms in Various Species.)

By R. ILLIDGE.

(Read 18th August, 1918.)

As regards winter and summer forms, heat and cold seem to have a strangely variable effect on the colouration of butterflies. In some cases winter greatly intensifies their hues; especially so is this the case amongst the *Lycaenidæ*. It is usually supposed that summer warmth produces greater brilliancy of colour, but such is certainly not the case with regard to many of our butterflies, amongst which are the various members of the abovementioned family.

In this particular family stands the genus *Nacaduba*, almost all the local species of which exhibit in their winter garb a remarkable brilliancy of metallic splendour, which is not seen in summer forms, or, if so, is much duller and confined to the basal area in more or less restricted extent. In this genus, again, a remarkable feature must be noted, for the brilliant colouration of the winter form affects the female only, the male retaining its general appearance throughout the seasons. In the genus *Thysonotis*, of the same family, the reverse is the case, for in some of the winter forms of the male of *Thysonotis taygetus* we find the discal area occupied by a large white spot not seen in the summer form; female specimens, on the other hand, show but little, if any, variation.

In members of the family *Pieridæ*, notably of the genera *Huphina* and *Belenois*, extreme summer and winter forms are produced, which are so utterly unlike each other that they have been described as distinct species. *Huphina scyllara*, found throughout the year, has a distinct monthly change in colour. In winter (June) it is slate colour, and in summer (December) very pale yellow. It has intermediate clay-colour and bright yellow forms varying with the months, some having a dark venation, and others white.

Not only is the colouration of many butterflies affected but the shape of the wings also varies to such a degree as to have caused authors not knowing them as merely forms of the one species to bestow specific rank on them, as in *McJanitis leda bankia* and *M. barnardi*.

With others of our butterflies there is but little, if any, seasonal difference, though in many much variation, especially in the genus *Catopsilia* amongst the Pieridae and *Hypolimnas* in the Nymphalidae. In the two forms *Catopsilia*, (*C. pyranthe pythias* and *C. lacteola*) it is singular to note that *C. lacteola* brood follows *C. pyranthe pythias* brood so closely that they overlap, and may be found flying together. Having had succeeding broods of these, the first has always produced *C. pyranthe pythias* and the second *C. lacteola*.

ON TWO INTRODUCED SLUGS.

By JOHN SHIRLEY, D.Sc.

(Read 17th June, 1918.)

At the May (1918) meeting of the Club, Mr. Henry Tryon, Government Entomologist, exhibited two species of slugs that seemed unusual to him, and handed them over for identification. These proved to be the following introduced English species:—

1. *Limax maximus* L.
2. *Milax gagates* Drap.

The first is the largest, 4 inches to 6 inches, of the English slugs, and usually feeds at night. In the daytime it hides in hedgerows, crevices of bark, under fallen timber, stones, &c. It varies in colour, but is usually yellowish-gray. It is by no means a welcome importation, as experience in Tasmania and New South Wales has proved.

The second has also become abundant in Tasmania, but is rare in New South Wales and Queensland. The mantle is distinctly bilobed, and, when the animal is at rest, is somewhat angulated on the right side.

WRENS OF THE BRISBANE DISTRICT.

By R. ILLIDGE.

(Read 15th March, 1920.)

During a visit to Chermside Hills some members of the party reported having seen the Silvery-blue Wren, a

species which I had myself taken in former years in similar localities near Brisbane. However, one of our members rather doubted the report as to this species, and thought that they had mistaken the Variegated Wren for it. Some confirmation of this doubt arose whilst at Enoggera with the R.A.O.U. The Variegated Wrens were quite plentiful along the creek at foot of the dam, and amongst them I noted one which had but a trace of the rich *rufous scapularies*, which usually partly conceal the blue on the back of these birds.

It is worthy of note that whilst camped during December, 1919, on the eastern side of the Lamington Reserve, we saw full-plumaged males of the Variegated Wren. We have also seen them at Goodna in March and again during October, at Enoggera, and I have seen at most times of year these birds in full plume; hence, it seems reasonable that when adult the males retain their colours, at any rate so far as regards our local species.

The local species of the *Maluri*, or Superb Warblers, are:—

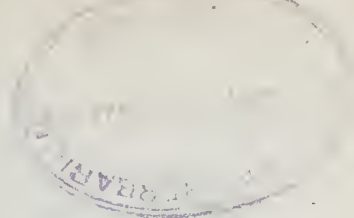
Malurus melanocephalus (Vig. and Hors.), Orange-backed Wren;

Malurus lamberti (Vig. and Hors.); *Variegated Wren*.

Malurus cyanocephalus (Sharpe); *Silvery-blue Wren*.

Of these the first two species are common, and the last, if still about the vicinity of Brisbane, is very rare. Some years ago it was not uncommon at Southport, and I have noted it as far north as Gympie. West of the Too-woomba Range, at Miles, it was plentiful along Dogwood Creek.





The Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES.

VOL. II.

OCTOBER, 1920

No. 4.

PROCEEDINGS.

JULY 19—Lecture by Professor H. C. Richards, D.Sc.;
—"Some Notes on the Structure and Jointings of the
Municipal Quarries, Toowoomba." (See pp.).

The chairman (Mr. G. H. Barker) congratulated Professor Richards on his being appointed to represent the Queensland University at the first Pan-Pacific Conference, to be held at Honolulu, and for which he was leaving next day. A welcome was extended to Mr. Chas. Barrett, of Melbourne, who was passing through Brisbane on his way to Dunk Island (North Queensland) to carry out ornithological investigations.

JULY 31—Visit to Queensland Museum. Members taken round the Museum by the Director (Mr. H. A. Longman, F.L.S.), the Entomologist (Mr. H. Hacker), and the Conchologist (Dr. Shirley), and afterwards entertained at afternoon tea by Mr. and Mrs. Longman.

AUGUST 14—Excursion to Mount Gravatt.

AUGUST 16—Microscopical Evening.

SEPTEMBER 4-5—Excursion to Bribie Island. This outing, which was attended by over twenty members, proved very enjoyable. Rain had stimulated the flowers, and they were found to be at their best. Many species of birds were noted, and observations of interest made in other branches of natural history.

SEPTEMBER 25—Wild Flower Show and General Natural History Exhibition. (Particulars elsewhere.)

During September the Council of the Club gave consideration to the outlook regarding the National Parks, and decided to convene a meeting of societies interested in the safeguarding of these reservations. A motion was also carried congratulating Mr. A. H. Chisholm on his action in attending a Land Court and endeavouring to prevent portion of the National Park, Macpherson Range, being thrown open to grazing license.

NATURAL HISTORY EXHIBITION.

The Wild Flower Show and General Natural History Exhibition, held at the School of Arts, Brisbane, on Saturday evening, 25th September, was the most successful of its kind yet promoted by the Queensland Field Naturalists' Club. There was a large attendance during the evening, and a marked degree of interest was taken in the exhibition generally.

The Mayor of Brisbane (Alderman Maxwell), who was introduced by the President of the Club (Mr. G. H. Barker), in opening the show, confessed that he had been greatly surprised to see such a splendid exhibition. He considered that the club was doing excellent service to the community, not only in acquainting people with the natural history of other States, but in teaching the beauties of the near-at-hand. He did not know any prettier city in Australia than Brisbane, and it was good to see that its neighbourhood and other Queensland centres could produce such beautiful wild flowers.

A brief account of each section (with the names of the respective conveners in brackets) is given below.

BOTANY.

(C. T. WHITE.)

INTERSTATE EXHIBITS.—From Mr. J. F. Bailey, Director Botanic Gardens, Adelaide.—Collection of South Australian wild flowers gathered by himself, Dr. R. S. Rogers, and other members of the Field Naturalists' section of the Royal Society of South Australia. From Mr. J. Cronin, Director Botanic Gardens, Melbourne, Victoria.—A collection of Victorian wild flowers. From Mr. J. H. Maiden, I.S.O., F.R.S., Director Botanic Gardens, Sydney, N.S.W.—A collection of New South Wales wild flowers, including five fine specimens of the Waratah (*Telopea speciocissima*) and a number of Australian flowers cultivated in the Sydney Botanic Gardens.

QUEENSLAND EXHIBITS.—By Miss Ivy Lee.—Specimens from Stradbroke Island, including large quantities of *Boronia pinnata*, *Boronia falcifolia*, *Phaius grandifolius*, *Sowerbæa juncea*, etc. By Mr. W. B. Harward (received through Mr. E. W. Bick, Curator Botanic Gardens, Brisbane).—Collection from Stradbroke Island, containing *Boronia pinnata*, *Boronia falcifolia*, *Phaius* spp., *Epacris obtusifolia*, *Callistemon pachyphyllus* (Swamp Bottle-brush) showing three different shades of colour (the common blood-red, a salmon pink, and a greenish yellow form respectively). By Mr. N. V. I. Agnew.—Specimens from Stradbroke Island, including *Boronia* spp., *Conospermum taxifolium*, *Blanfordia flammea* var. *aurea* (Yellow Christmas Bell).

By Mr. H. D. Curtis.—A very comprehensive collection from the Albert River district, including "Golden Candlestick" (*Banksia collina*), River Lily (*Crinum pedunculatum*), *Pentaceros australis*, several ground orchids, and a beautiful pink-flowering form of the Queensland Blue Gum (*Eucalyptus tereticornis*), Native Clematis, and basket and fan made from sterile fronds of the Rock or Oak-leaf Fern (*Polypodium (Drynaria) rigidulum*). By Miss Geissmann and Miss Baird.—A collection from Tambourine Mountain. Specially noteworthy in this collection were some daintily arranged vases of orchids including *Dendrobium Kingianum*, *Diuris aurea*, *Gastrodia sesamoides*, and *Glossodia major*. By Mr. G. H. Barker.—Living plants in flower of *Dendrobium gracilicaule* and other orchids.

By Mr. J. Stitt.—A few specimens from Bundaberg, Pittsworth, and Toowoomba. By Mrs. Hobler.—Specimens from Jandowae. By Mrs. E. Taylor.—A number of specimens from Caloundra, including *Callistemon pachyphyllus*, the Swamp Bottle-brush, showing three distinct colour grades in the flowers, viz., deep blood-red, salmon pink, and greenish yellow. By Mr. J. R. Sweet.—Flowers from Stanthorpe, including *Stypandra glauca*, a beautiful blue-flowering iridaceous plant. By Mr. and Mrs. Solway and Mr. D. Hayes.—Specimens from Russell Island, showing a very representative collection of Moreton Bay wild flowers. By Mrs. J. R. Shilliday.—Wild flowers from the Darling Downs. By Miss C. Dewar.—Wild flowers from Thulimbah, Stanthorpe district. (This and the previous five parcels received through Miss E. N. Parker.)

Special thanks are due to the following ladies and gentlemen who gave a considerable amount of time in the afternoon to arranging and in the evening to selling

flowers:—Mesdames L. Franzen, H. A. Longman, E. M. Mutch, and H. D. Curtis; Misses H. D. Clark, E. N. Parker, H. Geissmann, and Baird; Messrs. G. H. Barker, H. D. Curtis, J. C. Smith, and C. W. Holland. Labelling of the specimens, which took a considerable amount of time, was performed by Messrs. C. T. White (Government Botanist), and W. D. Francis (Assistant Government Botanist).

GENERAL ZOOLOGY.

(H. A. LONGMAN.)

Mr. H. A. Longman, F.L.S., Director Queensland Museum, exhibited a series of zoological specimens which were attractively mounted. Among these were the following:—*Pseudochirus cervinus* (Lgmn.), a rare fawn "opossum" from the Atherton Tableland; *Acrobates pygmaeus* (Shaw), the pygmy flying phalanger, or "feather-tail," with young in pouch; *Phascologale minutissima* (Gould), the pygmy pouched mouse, with young; *Neoceratodus forsteri* (Krefft), the Queensland lung-fish, with dental plates; *Fierasfer homei* (Rich), the messmate fish, which lives partly inside species of bêche-de-mer; *Centriscus cristatus* (De Vis), the curious razor-fish, so called from the razor-like edge of its ventral surface; *Haplocarcinus marsupialis* (Hl.), a tiny crab which lives in a coral home; and a very fine dried series of star-fishes, *Pentaceros* and *Luidia*, spp., collected at Bowen, and coloured from life by Mr. E. H. Rainford.

ENTOMOLOGY.

(R. ILLIDGE.)

By Mr. L. Franzen.—A box with rare *Ogyris* butterflies, viz.:—*O. zozine*, *O. orates*, *O. amaryllis*, and *O. olane*, also a series of *Pseudodipsas digglesi*. (All these were bred specimens and in fine condition.) Specimens of the moth *Antheræa eucalypti*. These also were bred, were in excellent condition, and exhibited some nice varieties.

By Mr. R. Illidge.—A case of 16 species of *Morpho* from Mexico and Central and South America; a large double case of representative *Papilionidæ* from all parts of the world; also, a small case of Australian *Rhopalocera*, including *Ogyris amaryllis* (Brisbane and Darling Downs forms), *Ogyris orates*, *Ogyris zozine*, *Miletus delicia*, *Deudorix diovis*, and others, all bred specimens, freshly obtained.

ORNITHOLOGY.

(A. H. CHISHOLM.)

Since the Field Naturalists' Club does not encourage the collecting of birds or eggs, except for strictly scientific purposes, the display in the ornithological section could not well be representative of the general activities of members in the study of bird life. However, Mr. R. Illidge brought along three cases of skins of typical Queensland forms, including the now very rare *Psephotus pulcherrimus* (Beautiful Parrot), *Cyclopsitta coxeni* (Fig Parrot), and other birds which were once plentiful but are now seldom seen. None of these specimens was taken less than forty years ago, and it is a high tribute to the taxidermic skill of Mr. Illidge that they are all without blemish.

In addition, a nice lot of birds, mounted and under glass shades, was shown by Mr. F. Smith, of Kelvin Grove, and another large case of pretty species was loaned by Mr. E. Day, of George street, City.

CONCHOLOGY.

(J. SHIRLEY, D.Sc.)

Dr. J. Shirley exhibited in four glass-topped cases specimens of Queensland cowries, volutes, harpas, and murices. The cowries included the signal cowrie, *Cypræa mappa*; the tortoise cowrie, *Cypræa testudinaria*; the Argus cowrie, *Cypræa argus*, so called from the numerous eye-spots covering its surface; the lynx and panther cowries, *Cypræa lynx* and *Cypræa pantheina*; the calf cowrie, *Cypræa vitellus*; the ugly cowrie, *Cypræa thesites*, &c. These shells in all ages have been admired by man; and many specimens have been exhumed from Nineveh and other ancient cities.

Queensland is specially rich in beautiful species of *Voluta*, and among those exhibited were *Voluta magnifica*, one of our largest forms; the bat volute, *Voluta respertilio*; the marbled volute, *Voluta marmorata*; the snowy volute, *Voluta nivosa*; and the numerous varieties of *Voluta vera* and *piperita*. The harp shells are so called from the general outline simulating a harp, while the parallel ribs resemble harp strings. The colours and patterns are the most elegant and artistic of molluscan designs. Of this group were shown *Harpa amouretta*, *H. articularis*, *H. conoidalis*, *H. crassa*, *H. gracilis*, *H. nobilis*, and *H. ventricosa*. The deepwater species of *Murex*, with wing-like ornamentation,

and the spiny species from rocky coasts were equally represented; the former being exemplified by *M. acanthopterus*, *Bedualli*, and *triformis*; the latter by *M. aduncospinosus*, *cervicornis*, *brevispina*, *ternispina*, and *tenuispina*.

MICROSCOPY.

(W. R. COLLEDGE AND W. M. TANNER.)

By Messrs. Colledge and Tanner.—Living pond-life specimens under the microscope.

PHOTOGRAPHY.

(R. L. HIGGINS.)

The exhibition of photographs gave an interesting indication of the scenery and subjects that are to be found by members who take advantage of the monthly excursions arranged by the Field Naturalists' Club. The photographs lent for exhibit were by Messrs. A. H. Chisholm, F. Robinson, C. E. S. Fryer, W. J. Sanderson, R. L. Higgins, and W. R. Colledge. The photographs by Messrs. Chisholm and Robinson gave very interesting and instructive lessons in the habits of native birds, while those by Messrs. Fryer, Sanderson, and Higgins showed the scenic beauties revealed during the Club's excursions, the most noted places being the National Park of Macpherson Range, Mount Glorious district, the Glasshouse Mountains, and the Bunya Mountains.

Mr. Colledge showed an excellent set of enlarged micro-photographic sections of pond-life studies.

TRANSACTIONS.

NOTES ON THE VENT STRUCTURES AND JOINTING OF THE MUNICIPAL QUARRY, TOOWOOMBA, QUEENSLAND.*

BY H. C. RICHARDS, D.Sc., Professor of Geology and Mineralogy, University of Queensland.

The Toowoomba Municipal Quarry is noteworthy in several respects, and the decision of the Toowoomba City Council to preserve the most interesting features showing

* Read before Field Naturalists' Club, 19th July, 1920.

in the quarry is one which is to be highly commended, and which in the future will earn the grateful thanks of students of geology, and those interested in natural phenomena.

The quarry, which is used for obtaining material for road making, pitching, and kerbing purposes, is situated on the edge of the range, near Toowoomba, and the stone worked is a fine-grained olivine basalt—a volcanic rock which has been poured out on to the surface from a volcano.

Owing to the quarry having been worked extensively for some time, the excavations are large and the cliff faces show structures of various kinds. The feature which first arrests attention is the manner in which the stone in the quarry breaks, as shown by the cracks in the faces of the quarry. The regular cracks are due to a well-developed system of joints which are, generally speaking, either vertical or horizontal in their disposition. When the vertical joints are the more pronounced, columnar structure results, and this type occurs in most of the quarry. The regularity of the jointing is interfered with in several parts of the quarry, but at two places in particular there are very marked interferences with the jointing.

These places mark the points where two volcanic vents have been forced through the volcanic rock, and the jointing of the rock alongside the vents is approximately parallel to the wall of the vent—that is to say, vertical.

The horizontal jointing in the rock between the two vents passes into vertical jointing alongside the vents, so that a concentric series of saucer-shaped joints is developed between the two vents. One of the vents has been exposed through being worked into, and it shows evidence of having been plugged up with boulders and smaller fragments of volcanic rock which have fallen back into the vent after having been blown out; this material is known as volcanic agglomerate, and it is much more altered and decomposed to-day than the surrounding rock. The other vent has not yet been exposed, but from the disposition of the jointing it is clear that the wall has been very closely approached.

The olivine basalt rock in the quarry was poured out on the surface in what is known as Upper Cainozoic times—a period quite young geologically—and in all probability the material was poured out of a crack or fissure, there being several flows. The openings appear to have become choked later on, and, owing to the openings being restricted, the latter periods of the activity were much more explosive in their character. The volcanic ash and finer fragments which

were hurled forth were collected in part around the various centres of activity, and on the road a few chains from the quarry accumulations of this volcanic ash in the bedded form known as volcanic tuff may be seen. Subsequent flows of basalt near the tuff have somewhat disturbed it, but its fragmental characters, and also its bedded characters, are clear.

The volcanic ash was expelled from small vents such as are shown in the quarry, and probably there were a large number of them distributed over the area in which the tuff was formed.

The jointing in the rock is the result of contraction of the volcanic rock on cooling, and if the rock is very homogeneous, then the jointing is likely to be regular. The olivine basalt in the quarry is a very homogeneous rock, consequently the jointing is very regular. When the molten rock was poured out there were two cooling surfaces—the upper surface of the flow and the floor on to which it was poured.

As the molten mass was very homogeneous the surface contraction exerted itself equally in all directions, and when the actual fracture took place the contraction acted towards points equally spaced throughout the plane of the surface*; the distance apart of these points was governed by the rigidity of the mass and the rate of cooling; in this quarry the points were about two feet apart. Fractures developed along directions at right angles to lines joining these points, and if the mass had been thoroughly homogeneous and the contraction perfect, the system of cracks or joints would have been hexagonal. The centres are not uniformly spaced, however, and the resulting columns are not regularly hexagonal, but have different numbers of sides, four, five, or six; the columns also are of different lengths.

Before the system of shrinkage, cracks, or joints had developed in the cooling basaltic flow, the two vents above referred to were formed, and the system of jointing became interfered with. The walls of the vent furnished new cooling planes, and the jointing of rock developed parallel to the walls, so that close up to the walls of the vent the jointing is vertical and the basalt has the appearance of being wrapped around the vents in a series of concentric layers. As the joints pass away from the vents they take on a more and more horizontal position, and the peculiar development of concentric saucer-shaped joints between the two vents resulted.

* Iddings, J. P. *Igneous Rocks*, vol. I., p. 320.

The basalt is very rich in olivine and is composed of olivine, felspar (plagioclase), augite, magnetite, and ilmenite. The plagioclase is much less abundant, and the olivine much more so in this rock than in the basaltic rocks of Queensland. The olivine occurs frequently as nodules or accumulated masses, which are sought for gem purposes, and individual crystals range in size from .44 mm. in diameter down to very small granules.

The specific gravity of the rock is 2.88, and a chemical analysis made in the laboratory of the Agricultural Chemist, Brisbane, gave the following results:—

	Per cent.			
Silica	..	..	..	50.27
Alumina	..	..	..	12.50
Ferric oxide	..	..	..	2.44
Ferrous oxide	..	..	..	8.18
Magnesia	..	..	..	10.25
Lime	..	..	..	7.52
Soda	..	..	..	3.29
Potash	..	..	..	1.42
Water	..	..	..	1.60
Titania	..	..	..	0.67
Phosphorous pentoxide	..	..	..	0.60
Manganese oxide	..	..	..	0.60
Total	..	..	..	99.34

PREDACEOUS GROUND BEETLES.

BY R. ILLIDGE.

Genus, *Castelneaudia*. This was formerly *Homalosoma* and *Trichosternus*, but, both being preoccupied, the present title has been suggested by a Russian writer on Carabidæ, and adopted by students of the family. It commemorates the name of the noted naturalist Count de Castelneau.

During a Field Naturalists' trip to Goodna Scrub in March, 1919, I took a species of the genus which I then considered was *C. renardi*, but on taking it out to pin, at once saw it had no resemblance to that insect. It appears to be nearest to *C. cordata*, but is larger than that species, and the elytral disc is flatter.

The capture of this insect suggested that a few notes on the natural history of the genus, and also its great

economic value in the destruction of very many insect pests, might prove of interest. So far as regards the vicinity of Brisbane, the insects are all now of rarity and seldom seen, though in earlier days, when scrubs were quite close to the town, several fine species were obtainable without much trouble. We have bred the large *C. renardi* from larvæ obtained under stones and logs at the old Kelvin Grove Scrub, also the smaller and rarer *C. viridescens*. Those of *C. imperiale* I also saw on my first visit, many years ago, with Dr. A. J. Turner, to Tambourine Mountain.

To see the Carabidæ at work one needs to visit a scrub with a good lantern, as they are nocturnal insects. The elytra of the species of the genus now under review are soldered together; hence, they cannot fly, but they are extremely active on their feet. They chase and seize many insects, sometimes other ground beetles, but the larval food seems to be mostly grubs of other insects, especially those of Dynastidæ, Melalonthidæ, &c. (the cane grub pests). I fed my larvæ on these in a box of sand and leaf-mould which I carried from the scrub where they were found. These were taken in the winter and pupated about two months after, for in October they became imagines. The grubs are not by any means pretty pets, but are voracious, greedy creatures, and if not well fed, eat one another.

Though the Carabidæ are usually termed ground beetles, there are many forms amongst them which are only found on trees, mostly under the bark during the day, but running about at night on the trunks in search of food. Again, all are not predaceous, but species of the tribe (Brachini) are said to be herbivorous, and protect themselves against predatory insects by a discharge of acrid matter from the anus.

In several of the species of *Castelneaudia* those of the male sex are characterized by a more slender build, notably so in *C. renardi*.

The described species still obtainable within a twenty-mile radius of Brisbane are—

<i>Castelneaudia renardi</i> .	<i>C. viridescens</i> .
<i>C. angulosa</i> .	<i>C. wilsoni</i> .
<i>C. subvirens</i> .	<i>C. marginifera</i> .
<i>C. cordata</i> .	

A RARE AND BEAUTIFUL NATIVE TECOMA.

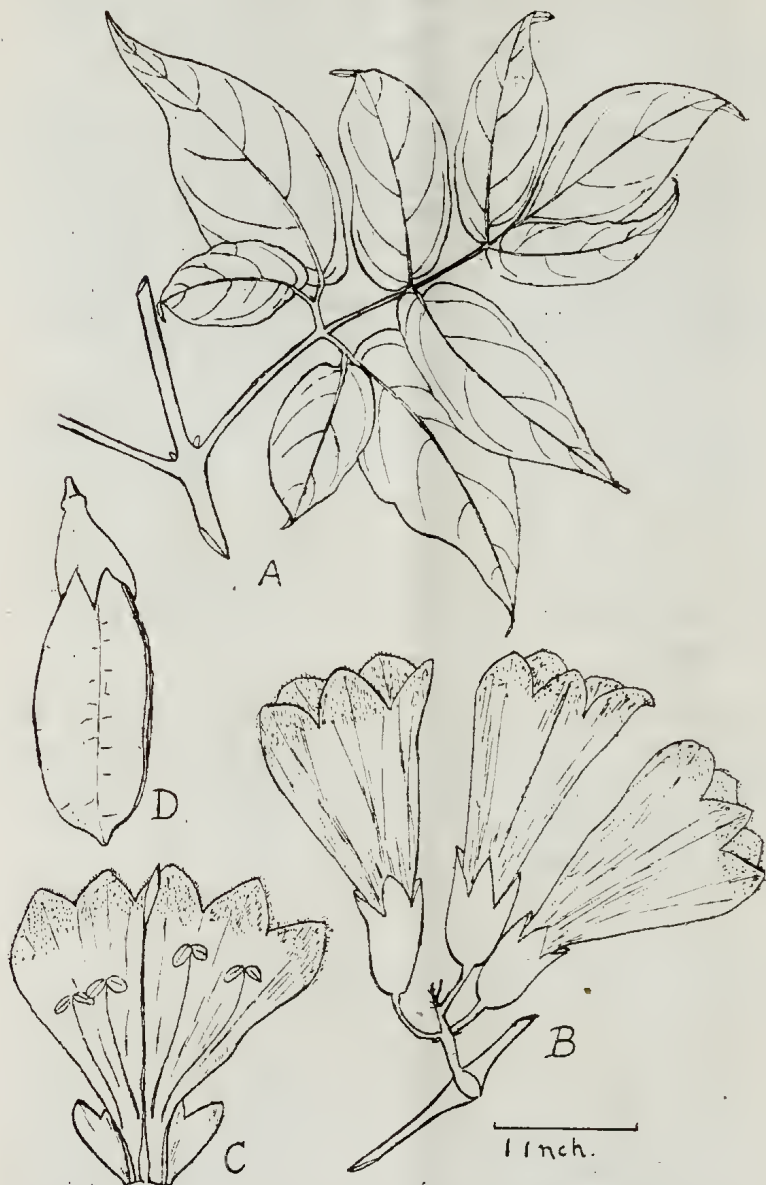
BY C. T. WHITE, F.L.S., Government Botanist.

For the past few years Mr. W. R. Petrie, the forests officer resident on Fraser Island, has sent me a number of botanical specimens from the island, mostly of timber trees. Among a recent small collection were specimens of one of the rarest and most beautiful of our native Bignoniaceæ, viz., *Tecoma Hillii*. I was particularly interested in receiving these specimens, as this apparently is the first time the plant has been gathered in a wild state since it was originally collected by Mr. Fred Turner in September, 1876.

In the "Queensland Flora," Part IV., p. 1134, the late F. M. Bailey remarked on this plant: "The only plant ever met with in a wild state was the one found by Mr. Fred Turner at Hervey Bay in 1876, when collecting in that locality for Mr. Walter Hill." Further, in conversation I had often heard Mr. Bailey remark that he had some doubts as to the plant being really a native, not only because it had never been rediscovered, but also because it was so unlike in general appearance all other Australian species of the genus.

Just before receiving Mr. Petrie's specimens I had been in communication with Mr. Turner regarding the plant, and had asked him to let me have the full particulars of his discovery of it. To this he kindly consented, and his notes are worthy of being put on record as a contribution to the history of botany in this State. Under date 23/4/1919 Mr. Turner wrote:—

"I have much pleasure in acceding to your request for particulars of my discovery of *Tecoma Hillii* (F.V.M.). In August, 1876, the Government of Queensland requested me to make a survey of the timbers and to collect the indigenous flora of the Hervey Bay district (I still have the original instructions that were issued to me), which was then between 40 and 50 miles from the nearest settlement. I traversed the district for six weeks and four days, and collected about 3,000 specimens. At the end of September I had descended a low, lightly timbered range, running almost due east and west, and about half a mile to the south was another low, almost parallel range, near the base of which I saw the most brilliant display of native flowers it has ever been my privilege to see in Australia, during my travels of more than 50,000 miles on this continent. I immediately made up my mind to obtain specimens, but between the object of my great desire and myself was a swamp nearly 400 yards wide, covered with a dense growth of *Gleichenia flabellata* (R.Br.), and *Lygodium scandens* (Swartz.), which formed an almost impenetrable mass. I essayed to cross the swamp although the two aboriginal men I had with me tried to dissuade me, mentioning big snakes, deep waterholes, and other, to me at



Tecoma Hillii—A rare and beautiful native climber; flowers rosy-purple, usually borne on the old wood but sometimes in the upper leaf-axils.
A—Leaf. B—Raceme of flowers. C—Flower laid open to show the four stamens and the central pistil. D—Seed-capsule.
(All reduced to the same scale).

that time, trifling matters. To have reached the other side by heading the swamp I should have had to traverse many miles, and in unexplored country it is not always possible to locate a particular spot. I cut my way through the entangled mass of vegetation, and the reward more than paid me for my exertion.

"The climber, which was about 9 feet high, with a similar diameter, had selected for its support a tree of *Clerodendron tomentosum* (R.Br.), which it had entirely enveloped with its long, flexible stems, on which were expanded thousands of beautiful, bright, rosy-purple flowers, each about 3 inches long—a simply lovely sight in the bright sunlight. I surveyed the plant from every point of view, because I knew that the species had never before been discovered, and the more I inspected it the more I admired it. With the aid of the aborigines I dug up the climber, removed the superfluous growths, carried it to camp and planted it in an extemporised wooden box, in which it was eventually carried to Brisbane and planted in the Botanic Gardens. In 1878 the climber flowered profusely, and I gave the late Mr. F. M. Bailey specimens of it; Mr. W. Hill sent my original specimens to Melbourne, and Mueller named the plant after him."

Mr. Turner's remarks as to having collected about three thousand specimens were most interesting to me, and as none of these specimens is now represented in the Government Herbarium at the Brisbane Botanic Gardens, I asked Mr. Turner if he knew what had been done with them. In reply he supplied the following information:—

"I was pleased to learn from your letter that you were interested in the plant specimens I collected at Hervey Bay and Fraser Island, in 1876, for the Government of Queensland. Mr. Walter Hill, Colonial Botanist, then my superior officer, forwarded sets of the specimens I collected to various herbaria, principally in Europe and America, where botanists were keenly interested in Australian vegetation owing to Bentham's "*Flora Australiensiis*," then going through the Press. In 1878, when *Tecoma Hillii* flowered in the Brisbane Botanic Gardens, I forwarded to Baron Mueller, in Melbourne, fresh specimens. He, when acknowledging the receipt of the specimens, told me that he had already named the plant after Mr. Hill, as he thought Mr. Hill had collected it. In Mueller's *Fragmenta** you will notice that I am given credit for discovering *Tecoma Hillii*—"During my five years' service in the Government of Queensland I collected in different parts of the State upwards of 10,000 specimens, most of which were distributed by Mr. Hill in other countries. What I regret most is that I kept no copies of my reports to Mr. Hill on the indigenous flora I collected. I wrote to Mr. J. F. Bailey, when he was Director of the Brisbane Botanic Gardens, for copies of the reports, but he informed me that 'all the records had been lost in the 1893 floods.'"

"The following brief extracts are from my instructions to proceed to Hervey Bay and Fraser Island in 1876. 'Specimens in flower and fruit of the tree known to the blacks as the 'Bee Bing.'†

* Vol. XI., p. 136. The original description appeared in vol. X., p. 101.—C.T.W.

† The "Bee Bing" is *Syncarpia Hillii*. It was in those dense jungles bordering Hervey Bay that poor Bidwill lost his life several years previous to my visit.—F.T.

The blacks make their canoes from the bark of this tree. Take particular notice of its distribution, measurements, plentiful or scarce, bark and timber.' Similar instructions were given me regarding all the arboreal vegetation:—'Make a general collection of the flora, and note its distribution, economic importance, &c.' I was also instructed to 'take with you Coeo-nuts, Cassava, Sugar Cane, Arrowroot, &c., and plant them near water.' Several years ago the late Mr. F. M. Bailey informed me, when he was on a visit to Sydney, that the Coco-nuts I planted on the shores of Hervey Bay had grown into fine specimens, and that no Coeo-nut palms were growing south of them."

SOME NIGHT-CALLING BIRDS.

BY G. H. BARKER.

I have been very interested for some time past in trying to place certain night-flying birds that I hear from



Stone Curlew (*Burhinus grallarius*) sitting on eggs, Geham.

[Photo by C. H. H. Jerrard.]

time to time at my home in Lutwyche. The one most frequently heard is a Dottrel, probably the black-fronted species so often seen along Kedron Brook. Mention should also be made of the Boobook Owl and Stone Plover (or Curlew), both of which are heard frequently. The Koel

Cuckoo (Mr. J. O'Neil Brennan's favourite) is also frequently heard in the early summer. This year I heard one at midnight in the week following Mr. Brennan's announcement in the *Daily Mail* of their arrival. Swans are also heard occasionally, and I have seen them on moonlight nights passing over in their peculiar V formation.

But of birds that I have heard and do not know there are quite a few. Some of them have rather sharp and strident calls, several times repeated. A little bird I frequently hear on hot and dark summer nights is one of the Kingfishers (*Halcyon* sp.). This little chap must fly at great heights at such times, as the space he appears to travel between his calls is not great when one remembers his speedy flight; and as his familiar little "Tich, Tich, Tich," comes floating down from above one wonders what spirit moves him to go hurtling through the dark spaces at that hour. Several of the Cuckoos are also heard occasionally.

Perhaps some other readers of the *Naturalist* have compiled lists of such birds; if so, I hope the notes will be printed.

TWO RARE BUTTERFLIES.

BY L. FRANZEN.

(A.) *Pseudodipsas digglesi* (Hew.).

On 24th August, 1920, I was out on one of my favourite hunts for larvæ and pupæ of butterflies, when at the foot of a small tree carrying mistletoe (*Loranthus longiflorus*) I discovered a number of larvæ and pupæ, both being attended by great numbers of the little black ant *Crematogaster laeviceps* (Sm.).

The *Loranthus* proved beyond all doubt to be the food plant of the larvæ, and until the first butterfly emerged on 13th September I was of the opinion that I had found a species of the genus *Ogyris*, with which I was not acquainted.

This (to me) new butterfly turned out to be *Pseudodipsas digglesi* (Hew.), a rarity, at any rate as far as the Brisbane district is concerned. From information gained I understand that this butterfly has not been obtained here by any lepidopterist for many years past.

The larva is very similar to those of the genus *Ogyris*, being very flat in structure and dark brown in colour. Its

only outstanding features are the two triangular light-coloured patches on the back, which readily separate it from any other larva I know.

The pupa is reddish brown in colour, and at first sight is easily mistaken for that of an *Ogyris*. On closer examination, it is observed to be slightly contracted behind the wing covers, giving it a pinched appearance, which at once makes it easy to determine.

The butterfly itself is too well known to lepidopterists to need describing, but I might mention that it is a typical brilliant blue *Lycænid*, and a perfect gem in the cabinet.



Pseudodipsas digglesi.

1 Larva.

2 Two pupæ in a
Loranthus leaf.

3 Butterfly.

Photos. in connection with this note were taken for the writer by Mr. H. Hacker, entomologist, Queensland Museum.

(B.) *Ogyris oroctes* (Hew.).

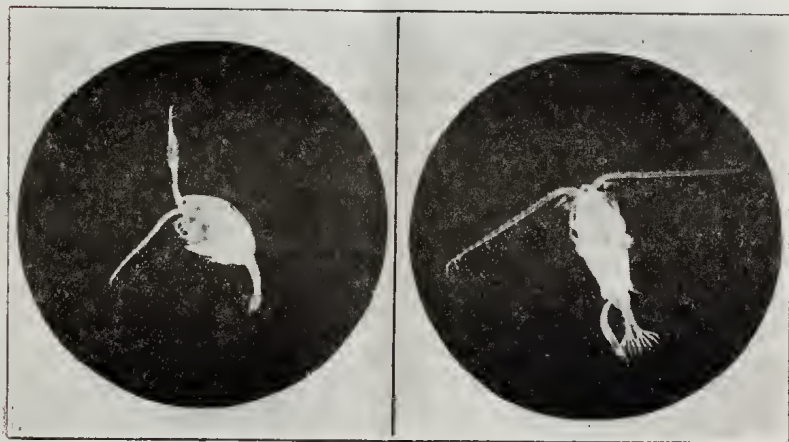
Of this butterfly I found larva and pupa, first at Woody Point, towards the end of April last, and during August at Toowong, from which I bred a few very nice specimens.

From older collectors I learn that this is the first record of this species from the Brisbane district. According to the official records by Waterhouse and Lyell, in their book, "The Butterflies of Australia," the farthest southerly record previously known is Mackay.

AN INTERESTING COPEPOD.

By W. R. COLLEDGE.

Our excursion to Goodna (3/6/20) yielded to the pond-hunters some fine specimens of *Diaptomus*. They are easily recognised by their antennæ, borne at right angles to, and sometimes quite as long as, the total length of the body. These organs, outstretched, balance the insect gracefully in the water. It moves steadily by means of its fan-shaped tail, edged with fine feathery setæ; but, more often, by a sudden contraction of the powerful muscles of the antennæ,

Male *Diaptomus*.Female *Diaptomus* with spermatophore.

Magnified 10 diameters.

it shoots through the water as if propelled from a catapult. A brilliant eye of ruby colour gleams in the head. The pair of antennæ are symmetrical in the female, but in the male one joint towards the extremity of the left is hinged, and the preceding joints much thickened in some species.

During the breeding season the female carries a sac of eggs attached to the lower part of the abdomen. These are partly held in position by the fifth pair of feet, which are specially suited for that purpose.

The male at this time provides what are technically known as "spermatophores." These are long sacs, each containing fluid, and a smaller sac inside filled with living sperms. Some brown granules lie in the bottom, and it is sealed with a plug of sticky mucus. When he approaches

the female, the left antenna is thrown around her, the hinged portion closing to keep her in position. The left one of his last pair of legs ends in a sickle-shaped hook; this also grasps the lower part of her body, while the right one, which is curiously modified to a pincer-like shape, is used as a hand to grasp the neck of the spermatophore and place it near the egg sac of the female. It adheres firmly by means of the mucus plug. She is then released, and darts off, adorned with this ornamental appendage.

There is still a considerable distance and much tough mucus to pass before the sperms can reach their objective; and they are likewise in danger of being snapped up, as dainty sausages, by the hungry carnivora that swarm in the water. But, as "love laughs at locksmiths," and Nature finds means to bridge great gulfs, the means have already been provided. Those brown granules, in the bottom of the sac, begin to grow, and act as if they were the landlords of the place. Not only do they fill their own end of the sac, but they extend further, giving the tenants notice that they must look for another lodging. Under the continuous pressure the mucus gradually yields, and the sperms find their way into the egg-mass to fertilise it, and ensure future progeny.

CHANNEL-BILL OR RAIN-BIRD.

(*Scythrops novæ-hollandiæ*).

BY R. ILLIDGE.

This strange bird, an aberrant form amongst the Cuckoos and quite the largest of our Australian species, is now very rare in the vicinity of Brisbane. It is a summer visitor, and usually makes its appearance about mid-September; but where it comes from and in what direction I cannot say, as I only know of it locally. Hall's "Key" records the habit as 1 to 8, which means all Australia and Tasmania except Western Australia, so it has a wide range.

I infer that it comes from North to escape the very hot summer, and spreads down the coast to as far as Tasmania, where it probably only remains a very short time. Here in Queensland it stays quite half the year, and is equally at home in the scrubs and forests, usually the latter in the early morning. I have seen little groups of

perhaps a dozen, sometimes only four or six, but usually in pairs.

In the forest the Leatherheads pay the Channel-bills special attention and cause much commotion. The large tail at such times comes into play, and is spread out fan-like; it is the only ornamental part of the bird. In the scrubs they frequent the great fig-trees, feeding on the figs.

A specimen in my possession was shot many years ago on a ridge near Taringa, and was engaged in devouring a giant phasma. The phasma (*P. titan*) I kept for several years; it was a large brown species about a foot long, and not at all common. As I never troubled to shoot another specimen of *Scythrops*, no further opportunity was afforded of ascertaining its food, for, though often observed, it was not easy to say what the birds were engaged in eating.

The name Channel-bill is given to the bird because of the grooves along the upper mandible, and as some supposed (according to Diggles) that its presence indicated a wet spell, the name "Rain-bird" came into use.

The nidification of the bird is unknown to me, and, although I have seen very many, I cannot remember ever having seen a young bird. It is probable that the Leatherheads (*Tropidorhynchus corniculatus*) could say something about its habits herein if able to speak, for they have a great aversion to it.

MEETINGS.

Members are asked to take note of the intended meetings and excursions for the remainder of the current year:—

NOVEMBER 6—Excursion to Wellington Point. Train leaves Melbourne Street 1.20 p.m.

NOVEMBER 18—General Meeting. Lecture by Mr. W. D. Francis, Assistant Government Botanist, on "Scrub Trees."

DECEMBER 4—Excursion to the Botanical Gardens. Meet at the Botanic Museum, 2.45 p.m.

DECEMBER 13—General meeting. Subject, "Pond Life."

DECEMBER 24-JANUARY 1—Camp out in the National Park (Macpherson Range). Members intending going to the National Park are requested to notify the Honorary Secretary as soon as possible.

JANUARY 26, 1921—Moggill Creek per motor boat (all day).

ACKNOWLEDGMENT.

Special thanks are due to our Honorary Secretary (Mr. J. C. Smith) for donating the blocks for this issue of the *Naturalist*, enabling several of the articles to be illustrated, and thus adding considerably to their interest and value.





The Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES.

VOL. II.

JANUARY, 1921.

No. 5.

PROCEEDINGS.

OCTOBER TO DECEMBER, 1920.

OCTOBER 18.—Lecture by Dr. J. Shirley: "Our Native Blacks," illustrated by lantern slides. The lecture dealt generally with the habits and customs of the aborigines.

NOVEMBER 15.—Largest attendance for the year. It was reported that, as a result of the Club's initiative, a conference of delegates from many societies had called a public meeting in connection with Queensland's National Parks. Illustrated lectures had been delivered by Dr. Shirley and Mr. A. H. Chisholm, and speeches by public men, after which resolutions were carried for presentation to the Minister for Lands. (A deputation which waited upon the Minister, shortly afterwards, was very favourably received. Mr. Coyne showed particular sympathy with the need for protecting native birds.)

Lecture for the evening: "Scrub Trees," by Mr. C. T. White, Government Botanist. Lantern slides were shown and a plea entered for more attention to native flora in the planting of street trees.

DECEMBER 11.—Visit to Botanic Gardens. Members were met by Mr. E. W. Bick (director) and Mr. C. T. White (Government Botanist), and shown all the flora of chief interest. A remarkable clump of prickly-pear (*Opuntia*) is growing near the director's residence, and Mr. Bick drew attention to the diseased condition of two of the plants, with which experiments are being made in the hope of discovering an active enemy of this plant-pest. A fine display of caladiums was admired, and much interest

was taken in seedling plants in the nursery, destined for schools and other public gardens. Afternoon tea was served and the thanks of members were tendered Mr. and Mrs. Biek by the President (Mr. G. H. Barker).

DECEMBER 13.—“Pond Life,” by Messrs. W. R. Colledge and W. M. Tauner. Microscopic exhibits were shown (Messrs. Preston and Tiegs assisting), and Mr. Colledge submitted a number of interesting lantern slides. Exhibits were presented by Mr. C. D. Gillies and Dr. G. Comyn, and Mr. H. Tryon showed, on behalf of Mr. B. Dunstan (Chief Government Geologist), a fine collection of Queensland gems, chiefly sapphires.

CHRISTMAS CAMPS.—Various causes militated against a repetition of the successful combined visit of 1918 to the National Park of the Macpherson Range. Accordingly, a party of about ten persons, led by Mr. R. L. Higgins, visited the Lamington end of the reservation, near Running Creek, while the vice-president (Mr. Chisholm), the secretary (Mr. Smith), and Dr. Jefferis Turner went to Roberts' Plateau. A good deal of interesting material was gathered, chiefly at the Roberts' side. Moths were particularly plentiful, and several new and rare species were taken.

TRANSACTIONS.

THE TESTACEOUS RHIZOPODA OF THE BRISBANE DISTRICT.

Presidential Address, March, 1920 (in abstracto).

By C. D. GILLIES, M.Sc.

Amongst the commonest objects to be observed in the microscopic examination of pond water are the testaceous Rhizopoda, which are very primitive animals belonging to the Protozoa; in a typical member of the group, the body consists of a little mass of protoplasm, from which are given off processes called pseudopods or “false feet.”

These structures are highly characteristic and constitute the organs of locomotion; when they are blunt (*e.g.*, *Diffugia*, *Arcella*) the term lobose is used in describing them, when long and sharp (*e.g.*, *Euglypha*, *Trinema*) they are known as filose. This difference in the pseudopods is employed to separate the group into the two orders Lobosa

and Filosa, the terms being self-explanatory. As the name implies, these organisms are provided with a shell or test, in which a wonderful diversity of form and structure is exhibited in the various genera.

In regard to material, the best results are obtained from squeezings of water plants and sphagnum, as well as the flocculent sediment found at the bottom of pools; to the samples a few drops of 40 per cent. formalin should be added for preservation (1:20).

Between twenty and thirty species are found round Brisbane; most of these are comparatively common, and some, such as *Arcella vulgaris*, at certain periods of the year are exceedingly abundant; on the other hand, I have observed *Cyphoderia ampulla* on only one occasion.

Material may be obtained from numerous localities around Brisbane, and most of the pools will furnish specimens of *Arcella*, *Centropyxis*, *Diffugia*, *Euglypha*, and *Trinema*. One of the best ponds I have yet examined is a lagoon in the Brisbane Botanic Gardens, near the old bird house. For some species preferring a sphagnum habitat, pools and drains on the site of the Sunnybank swamp have provided excellent specimens of *Nebela caudata*, *Assulina muscorum*, *Euglypha compressa*, and *Campascus triqueter* (see plate).

In the plate is portrayed a number of the commoner species met with round Brisbane, and it is hoped that it may prove to be of some assistance to those interested in the subject: the numbers in brackets refer to the figures in the plate.

ORDER LOBOSA.

Genus *Arcella*.—Test more or less hemispherical; chitinous; exhibiting hexagonal areas under high powers.

1. *A. vulgaris*, Ehr. (1), comparatively small and hemispherical, usually plain but often faceted.
2. *A. mitrata* (2) Ldy., larger than *A. vulgaris* and usually faceted or gibbose.

3. *A. artocrea* (3), Ldy., test provided with a rim.

4. *A. discoides* (4), Ehr., flattened and disc-like.

Genus *Diffugia*.—Test composed of sand grains, or chitin and sand grains.

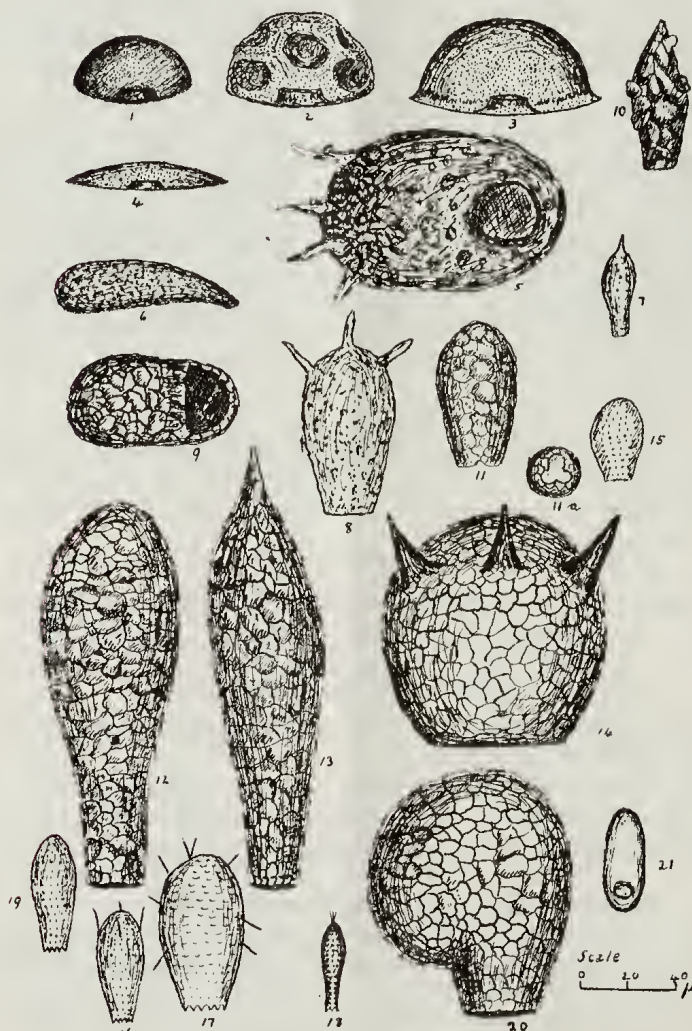
1. *D. oblonga*, Ehr. (12), test pyriform.

2. *D. acuminata*, Ehr. (10), test constructed of large grains; sharply pointed with no demarcation between spine and body of test.

3. *D. cornuta*, Leidy (13), similar to *D. oblonga*, but the rounded base or fundus is provided with a spine.

4. *D. lobostoma*, Leidy (11), mouth three lobed (see 11a).
5. *D. corona*, Wallich (14), more or less globular with several spines arising from fundus.
6. *D. constricta*, Leidy (9), flattened; mouth semicircular, situated on under surface.

Centropyxis aculeata, Stn. (5), similar to *D. constricta*, but the mouth is usually more or less circular, and the test is usually provided with spines.



SOME RHIZOPODS OF THE BRISBANE DISTRICT.

Genus *Lesquerusia*.—Somewhat similar to *Diffugia* in many features, but the shell is coiled.

1. *L. spiralis*, Ehr., test composed of little worm-like pellets.
 2. *L. modesta*, Rhumb. (20), test composed of sand grains.
- Nebela caudata*, Leidy (8), test compressed; mouth terminal; fundus usually provided with 1-4 spines.

ORDER FILOSA.

Genus *Euglypha*.—Test composed of scales; mouth toothed.

1. *E. acanthophora*, Ehr. (19), alveolar in outline.
2. *E. tuberculata*, Duj. (16), similar to *E. acanthophora*, but the fundus is ornamented with a small number of scale spines.
3. *E. compressa*, Cart. (17), large, compressed with the margins of the test usually spined.
4. *E. cristata*, Ldy. (18), test tubular; fundus provided with a cluster of scale spines.

Assulina muscorum, Gf. (15), test composed of scales, compressed and chocolate tinted. Margin of mouth irregular.

Trinema enchelys, Ldy. (21), test hyaline and oval in outline. Mouth similar in situation as in *D. constricta* and *C. aculeata*.

Pareuglypha reticulata, Pen. (7), test small and resembling *Euglypha*; fundus terminating in a conical process or spine.

Campascus triquetus, Pen., test retort-shaped, brownish in colour; granular.

EXPLANATION OF PLATE.

1. *Arcella vulgaris*, Ehr., side view.
2. *A. mitrata*, Ldy., side view.
3. *A. artocrea*, Ldy., side view.
4. *A. discoides*, Ehr., side view.
5. *Centropyxis aculeata*, Stn., mouth view.
6. *Campascus triquetus*, Pen., side view.
7. *Pareuglypha reticulata*, Pen., side view.
8. *Nebela caudata*, Ldy., side view.
9. *Diffugia constricta*, Leidy, mouth view.
10. *D. acuminata*, Ehr., side view.
11. *D. lobostoma*, Ldy., side view.
- 11a. *D. lobostoma*, Ldy., mouth view.
12. *D. oblonga*, Ehr., side view.
13. *D. cornuta*, Ldy., side view.
14. *D. corona*, Wallieh, side view.
15. *Assulina muscorum*, Graff, side view.
16. *Euglypha acanthophora*, Ehr., side view.
17. *E. compressa*, Carter, side view.
18. *E. cristata*, Ldy., side view.
19. *E. tuberculata*, Duj., side view.
20. *Lesquerusia modesta*, Rhumb., side view.
21. *Trinema enchelys*, Ldy., side view.

THE HOOP PINE AND ITS ALLIES.

By W. D. FRANCIS, Assistant Government Botanist.

The largest conifers in Queensland, and probably in Australia, are the Queensland kauri pines. Of these there are two species in the northern scrubs (*Agathis Palmerstoni* and *Agathis microstachya*), and one (*Agathis Moorei*), now almost extinct, in the scrubs between Eumundi and Maryborough in the south. They are grand, symmetrical trees, attaining a height of about 150 feet, with almost cylindrical, column-like barrels attaining a diameter of 8 or 9 feet.

The hoop pine and the bunya pine, though scarcely so gigantic and imposing, are even more graceful and symmetrical in habit than the kauris. The largest hoop pines I have seen attained a barrel diameter of at least 5 feet 4 inches, and an estimated height of about 160 feet; but trees of these dimensions are not very common, at least in Southern Queensland.

I would like to mention a tree figured and described in the "Australian Forestry Journal" for August, 1920, under the heading "A Record Hoop Pine," whose barrel measured 14 feet 4 inches in girth (4 feet 7 inches diameter), and which stood 86 feet from the ground to the first limbs and was felled in the Grafton district of New South Wales. The large Queensland specimens I have referred to are considerably larger than the Grafton district tree. The accompanying photograph shows the lower part of the barrel of a tree growing in the ranges near Emu Vale, in the Killarney district. It measured 16 feet 9 inches in girth 4 feet 6 inches above the ground. The bark is generally very thick; it measured 2½ inches on the tree in our picture.

The botanical name of the hoop pine, *Araucaria Cunninghamii*, is derived from "Araucanos," the native name for *Araucaria imbricata*, which is indigenous to Chili; the latter part of the name commemorates Allan Cunningham, botanist and explorer. The pattern of the bark, with its more or less distinct transverse, hoop-like markings, probably accounts for the origin of the common name.

The most important product of the hoop pine is its timber. It is by far the most extensively used of all Australian softwoods, and is the common timber for general indoor building purposes, such as lining and doormaking,

and for the manufacture of the cheaper kinds of furniture, butter boxes, &c. There are, however, many other timbers in the Queensland "scrubs" which could be advantageously substituted in many of these instances, timbers which are more ornamental, as well as more accessible to the timber-getter.

The minute structure of the wood of the hoop pine, and of conifers in general, is interesting. It consists



Photo. by W. D. Francis.

LOWER PORTION OF HOOP PINE.

This tree was photographed in the ranges near Emu Vale, Killarney district. Girth, 16 feet 9 inches, measured 4 feet 6 inches from the ground.

principally of closely packed cells (tracheids), which are closed at each end and whose walls are pierced by bordered pits. The long, open vessels which are present in the highest group of plants, the angiosperms, which comprise our common Australian trees such as eucalypts, cedar, Queensland beech, &c., are absent in the wood of pines. This fact is of considerable importance, as it enables one to determine whether a sample of an unknown wood is that of a conifer or an angiosperm; all commercial timbers belong to one of these two groups. This test is applied by cutting a smooth surface on the cut or sawn end of the timber with a sharp penknife, and examining it with a lens. The presence of "pores" (the long vessels in transverse section) indicates that the timber is that of an angiosperm; their absence shows that it is the timber of a conifer. The peculiarities in the microscopic structure of woods are of great value to the fossil botanist, as they furnish him with a fairly reliable means of classification in many cases.

The genus *Araucaria* contains 14 living species. There are 2 in Eastern Australia. *Araucaria Cunninghamii*, the hoop pine, is found as far South as the Hastings River in New South Wales, in Queensland North and South, and extending about 100 miles inland as at the Bunya Mountains, and in New Guinea. The bunya pine, *Araucaria Bidwilli*, is much more limited in distribution; it is confined to the Bunya Mountains and parts of the Blackall Range in Southern Queensland. The other species are distributed as under: 1 on Norfolk Island, 8 in New Caledonia, 1 in Chili, 1 in Bolivia, and 1 in Brazil. It is remarkable that the genus at the present day is confined to the Southern Hemisphere and many of the species limited to small areas or to small islands.

Among living trees the *Araucarias* are almost unrivalled in antiquity. To the fossil botanist they are the survivors of a great and ancient family often referred to as the araucarian pines. Their antecedents have been traced back as far as the Carboniferous period in the geological record. Trees very closely resembling living *Araucarias*, and termed by the generic name *Araucarites*, were abundant and widely spread over the world in the Jurassic and Cretaceous systems, and the family was still prevalent in the floras of the Northern Hemisphere in earlier Tertiary times.

Comparing the present distribution of the Araucarian Pines with that of the geological past, it is evident that the living trees are representatives of a declining race, and it would seem that their wonderful symmetry and grace-

fulness, which distinguish them from recent and more highly organised trees, were characteristics predominant in a past era.

BOWERS AND PLAYGROUNDS.

By A. H. CHISHOLM, State Secretary R.A.O.U.

"Without exception," wrote the late Mr. A. J. North, C.M.B.O.U., "the bower-building birds of Australia are the most extraordinary group of birds found in the world." Accepting this as a well-founded statement, Queenslanders should take pride in the fact that this State is richer than any other part of the Commonwealth in these remarkable birds and their affinities; of twelve species acknowledged by the Check List of the Royal Australasian Ornithologists' Union as members of the family Ptilonorynchidæ, all but two have been recorded for Queensland, and no less than eight are either confined to this State or extend only a short distance from its borders.

And yet, in spite of their opportunities and of the fascination of the subject, it is a fact that Queenslanders generally are doing little towards the study of this family of birds. For instance, it was left to southerners to give us full information regarding the nidification and the remarkable playgrounds of the Tooth-billed Bower-Bird (*Scenopæctes denti-rostris*), of North Queensland; and even to this day we have no published records as to whether the Cat-Birds (*Ailurædus*) follow the Tooth-bill or the Bower-Birds proper in the matter of "play-houses." There are two species in the genus *Ailurædus*, one (*A. maculosus*, the Spotted Cat-Bird) being confined to North Queensland, and the other (*A. smithi*) being the common Cat-Bird of the jungles of South Queensland and Northern New South Wales. Only the latter species was known up to the time John Gould published his supplementary *Hand-book* (1865) to the *Birds of Australia*, and of this the great birdman wrote: "While in the district in which this bird is found, my attention was directed to the acquisition of all the information I could obtain respecting its habits, as I considered it very probable that it might construct a bower similar to that of the Satin-Bird; but I could not satisfy myself that it does, nor could I discover its nest, or the situation in which it breeds."

It has long since been found that the Cat-Bird builds its nest (a very cleverly-built structure) in the crests of tree-ferns and similar situations, usually at a height of about 15 feet; but I know of no record regarding its playground other than one left by the late Mr. Kendall Broadbent (formerly ornithologist at the Queensland Museum) as a marginal note to his copy of Gould's *Hand-book*. This note runs: "The Cat-Bird was common in the Brisbane scrubs in 1868. Used to think it was a child crying the first time I heard it. It makes no bower—scratches the ground clean and lays down leaves to dance on.—K.B." This tallies closely with what Broadbent and others observed with regard to the Tooth-bill, which really has no claim to the name of Bower-Bird. This species (which Broadbent regarded as the "master mocking-bird of Australia") clears about a square yard of ground in the heart of the scrub, and lays thereon seven to nine large leaves, with which it plays and which it renews each morning. In view of this fact, and of the close oological relationship between the Tooth-bill and the Cat-Birds, it is not likely that Broadbent, a good field worker, made a mistake in ascribing the same quaint habits to the queer-voiced bird of our mountain scrubs. But how surprising it is that the playgrounds have not been found, or the habit remarked on, by other observers or settlers! Can it be that the practice is rare among the Cat-Birds?

Then there is the semi-mystery surrounding the playing habits of the beautiful Regent-Bird (*Sericulus melinus*). This beautiful creature, one of the loveliest of the world's avi-fauna, is a true Bower-Bird, both in habits and oology; but, though still fairly common, the remarkable fact is that its bower is very seldom discovered. Personally, I have found play-houses of the Satin Bower-Bird in almost every jungle area visited, but not until recently did I come across a bower which could with any certainty be ascribed to a Regent-Bird. In this case the structure was low, almost squat, and not to be compared in elegance to that of the Satin-Bird.

Gould saw nothing of the bower of the Regent-Bird, but he had definite information on the point from the late Mr. C. Coxen, who read a valuable paper on the subject at a meeting of the old Queensland Philosophical Society on the 23rd of May, 1864. Through the offices of Mr. Waller, a taxidermist, of Edward street, Mr. Coxen was enabled to view a Regent-Bird's bower in scrub on the banks of the Brisbane River. This bower they removed and placed on exhibit in the city. Since that time there have been other

records of Regent-Bird's bowers, but so few of them as to give rise to the doubt existing in the case of the Cat-Birds—whether the practice is not in some degree restricted among the birds.

There are numerous other interesting little points to be cleared in respect of this "most extraordinary family of birds." For instance: How long do the male Satin and Regent Birds, respectively, take to assume their full colour? Does the male bird alone construct the bower, and does it ever do so while in immature plumage? Do both birds share in the nest-building and attention to eggs and young? What is the reason for the predilection of the Satin-Bird for objects of a blue colour? Do the Bower-Birds *consciously* teach their young to mimic? (A correspondent says "Yes.") Is this mimicry a cleverly *conscious* ruse to draw attention from the young? (Another correspondent affirms that it is.) Other questions suggest themselves, but these will suffice for the present.

A few further observations of Mr. Broadbent's may be quoted from his marginal notes to the Gould book. Apropos of Gould's regret at inability to locate the nest of the Satin-Bird, "K.B." says: "Builds in clump of mistletoe in white gums; found nest in mountains at Maryland; built of small sticks, with a few gum-leaves for lining; two young ones, covered with grey down. December 20, 1886."

Regarding the Great Bower-Bird (*Chlamydera nuchalis*) Broadbent says: "This bird was very common at Kimberley, mouth of Norman River. I have shot eight old males at one bower, in July (?). They are as a rule very shy birds. Find their bower and wait is the only chance to get a specimen." Gould had a specimen of this species which he considered to be a female, because it lacked the nuchal adornment, on which point Broadbent observes: "Males and females both have the nuchal ornament, which is smaller in the female." He thinks Gould's bird was immature. A similar point is touched on in regard to the common Spotted Bower-Bird (*C. maculata*). Gould was in doubt as to whether the female ever acquired the lilaceous mark at the back of the neck. Broadbent writes "Yes," but does not comment on Gould's remark that "for the first and perhaps the second year, she is certainly without it."

Another interesting note concerns the little-known Fawn-breasted Bower-Bird (*C. cerviniventris*) of North Queensland and New Guinea. "At Port Moresby," writes

Broadbent, this bird is very common. Every morning he decorates his bower with fresh grapes; he makes a bower of sticks, and hangs the small bunches of green grapes on the front of the bower."

A DEATH ADDER'S MEAL.

By HEBER A. LONGMAN, Director Queensland Museum.

On Wednesday, 3rd November, a live specimen of the common house mouse, *Mus musculus*, was placed in a case containing a living death adder, *Acanthophis antarcticus*. After a few minutes the snake was attracted, and its quivering, sensitive tongue was protruded towards the mouse, which sat unconcernedly a few inches away. The fore part of the snake's body was advanced in a sinuous fold. It then struck with surprising swiftness, seizing the mouse by the fore-quarters.

The death adder hung on "like a bull-dog" for fifteen minutes, but, as the mouse gave convulsive movements fully ten minutes after being struck, probably little venom was injected. After relaxing its first hold the snake seized the mouse by the head, and proceeded very leisurely to swallow it by more or less alternate forward movements of the lower jaws. This process took just over half an hour, when the tip of the tail finally disappeared. Subsequently, muscular movements of the body marked the passage of the meal towards the stomach.

As is usual after feeding, the snake repeatedly yawned, and then leisurely crawled under a board. Although so lethargic, remaining for days partly covered with sand, the death adder, when roused, strikes sideways with marvellous swiftness.

This specimen has been living in the Queensland Museum since 16th November, 1918, and during that period it has fed only on five occasions.



The Queensland Naturalist.

THE ORGAN OF THE FIELD NATURALISTS' CLUB
AND ITS BRANCHES.

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No. 6.

PROCEEDINGS.

January to March, 1921.

ANNUAL MEETING.

The Club went into recess during January, and the first meeting of the year was held on 13th February. This was the Annual Meeting, and at it officers were elected, as set out on the cover-page of this issue. An innovation was the appointment of a Patron, and members expressed pleasure at the fact that His Excellency the Governor of Queensland (Sir Matthew Nathan) had agreed to accept this position.

Formal business, including the adoption of the annual balance-sheet, was followed by the President's address.

MIGRATION OF BIRDS.

Mr. BARKER, in speaking on this subject, emphasised its importance and wonder. It had been the subject of discussion, he said, since the dawn of history, and was still almost as great a mystery as ever; even those who had made it a life-study had touched but little more than the fringe of the subject. The Royal Australasian Ornithologists' Union had been making efforts to collate facts in regard to the regular movements of Australian birds, and had enlisted the services of observers at different points, including lighthouse-keepers along the coast and on the islands. Results, however, had been poor so far. It was to be hoped that the ranks of those sufficiently interested in Australian bird-life to observe and record the movements of our avi-fauna, would be materially increased, and that the resulting sheaf of records would lay bare much that is now obscure.

Proceeding, the retiring President discussed the significance of the word "migration," as applied to the movements of birds. "Many writers," he said, "have treated it as synonymous with geographical distribution, and have elaborated intricate theories of land-bridges, glacial action, and lost continents to support their theories. Others read it to mean any movement of bird-life, nomadic or regular, collective or individual, extensive or local. At

this date, however, serious students of the question are inclined to define the word as meaning a regular annual movement from one country and clime to entirely different ones, one journey being for food and the return for breeding purposes. If we are to accept this term, then we in Australia are almost without true migrants, and the study of the subject would seem to be a labour lost. But if it can be truthfully stated that we are wanting in true migrants, we have a wonderful field of partial migrants commanding attention."

After dealing in interesting detail with migration as studied in the Northern Hemisphere, Mr. Barker said:—"No paper on migration" would be complete without particular mention of the place this continent occupies in the subject. Zoologists have divided the earth's surface into seven or eight regions, based on the distinct differences that exist in the classification of the birds and mammals in such regions. Of late, however, ornithologists are inclined to a preliminary or main division of only two regions—Australia and the rest of the world. This is specially applicable in the study of our present subject, for, as already mentioned, Australia is the one country that possesses no true migrants—that is, birds which breed in Australia but move off outside the Wallace line to spend the Southern winter. In saying this, I am aware that certain individuals, such as the Koel, Merops, Roller, and Swallow, do get a little further afield; but the species as a whole do not leave our shores. When, however, we turn to the subject of partial migrants, the field is a very big one.

"Out of the twenty-one orders represented in Australia, fifteen furnish examples under this head; and of the 750 species represented, more than a third of the number are migratory in some degree. Those students who are acquainted with the order Charadriiformes may, perhaps, think I am in error in my statement that we have no true migrants, especially when they recall the fact that several of the genera of this order yearly make the stupendous journey of 8,000-10,000 miles to the Siberian tundras, and return, and that others journey to India, Japan, and China. Nevertheless, I consider that a bird's country is that in which it breeds, and when it migrates to miss the winter of that spot it can only be considered a visitor to its summer residence. Therefore, such birds as the Sea Curlew (*Numenius*), Lesser Golden Plover (*Charadrius*), and Ringed Dottrell (*Aegialitis*) are Asiatic birds, and should only appear on our lists as extra-limital.

"The position of the Charadriiformes in relation to the function of migration is so curious and interesting that it

is worthy of particular mention. By far the greater number of them migrate annually to Northern Siberia, but here, again, there is no sharp line of distinction, at any rate so far as families are concerned. Let us take the Plovers: The Spur-winged, Masked, and Black-breasted species breed in Australia, and do not leave our shores, whilst the Grey Plover and the Lesser Golden Plover journey to the far north of Siberia. Of the Dottrells, four stay and breed in Australia, four journey to Siberia, one to China and Japan, one to Mongolia, and one (strangest of all) to New Zealand. Sixteen further birds in affinity, such as Godwits, Curlews, Stints, and Sandpipers, journey to Siberia, and a like number never move out of Australia at all. Of other families of birds strongly represented among migrants, mention should be made of Cuckoos, Flycatchers, Robins, Pigeons, Grebes, Herons, Geese, Swallows, Wood-Swallows, and Swifts.

"But to follow the interesting movements of such a large list cannot be compassed in this article, which, at its best, only aims at being an introduction to the subject; and I therefore conclude, expressing the hope that this important branch of bird study will not be neglected by Club members during the coming year."

QUEENSLAND GEMS.

The feature of the March (21st) meeting of the Club was an address by Mr. B. Dunstan, Chief Government Geologist, on "Queensland Gems." The lecturer pointed out that this State is rich in sapphires of almost every shade, including the notable blue variety, which has a distinctiveness separating it from every other sapphire known. This point was emphasised in London, where it was discovered that Queensland "blues" were being sold as Ceylon sapphires. After telling a story relating to the purchase for 10s. of a beautiful yellow sapphire from Anakie, which recently brought £60, Mr. Dunstan pleaded the cause of the parti-coloured sapphire. This gem, he said, is sometimes yellow and blue and sometimes yellow and green, very beautiful, and cannot be imitated by a synthetic stone; and yet people will not buy it because it is imagined that the variegated colours indicate a flaw of some kind. Mr. Dunstan showed beautiful examples of the various sapphires, also a specimen of turquoise from the Brisbane district, a cairngorm from Stanthorpe, a topaz from Bowen, opals from West Queensland, and aquamarines and emeralds, the last-mentioned of which he described as the most beautiful stones in the world. A reference to the ribbon-stone of Camooweal led the lecturer to observe that

this stone, together with jaspers and agates, decorated the corners of the beautiful casket, given the Prince of Wales by Queensland, which has been attracting much marked attention in London.

Mr. Dunstan (who was listened to attentively by a large audience) was thanked on the motion of Messrs. G. H. Barker and C. T. White, supported by the President (Mr. Chisholm).

Exhibits at the meeting included a collection of Victorian plants gathered by the exhibitor, Mr. White (Government Botanist), and showing affinity with certain plants in the rain-forest areas of Queensland. Mr. Franzen showed a typical form and melanic example of the butterfly, *Acraca andromacha*.

EASTER CAMP-OUT.

The Easter camp-out of the Club was held at Stradbroke Island (Moreton Bay) from Good Friday to Easter Monday. Twenty-five members and friends took part, and all spent a pleasant and interesting time, thanks partly to the kindness of the Chief Clerk of the Home Department (Mr. C. E. Chuter) and the good people of the Dunwich Home. Reports are as follow:—

BOTANY OF STRADBROKE ISLAND.

By C. T. WHITE, F.L.S., Government Botanist.

The flora of Stradbroke Island has previously received attention from the members of the Club, and a brief reference to some of the outstanding features noticed on our last trip will be found in this journal.*

On our recent trip the camp was pitched at a spot not very far from our previous locality, and the remarks made here refer only to the country lying between Dunwich and Myora, and must not be taken as representative of the flora of the island as a whole. For the purpose of convenience, the species gathered or noticed may be grouped according to their habitats—viz., whether occurring on the sea-shore, fresh-water swamps, and scrub or open forest. Only the outstanding plants, or those in flower or fruit are noticed. Had the visit been made in the spring when the Boronias, Leguminosæ, Liliacæ, Ground Orchids, &c., were in flower, the list would have been considerably larger.

Mangroves.—*Avicennia officinalis*, the White Mangrove, was the common species. Others more sparingly occurring were *Rhizophora mucronata* (Red Mangrove) and *Bruguiera Rheedei* (Black Mangrove).

* Vol. II., pp. 67-68.

Shore Trees.—*Hibiscus tiliaceus*, *Vitex trifolia*, *Alec-tryon coriaceum*, *Pandanus pedunculatus*, and the shrub *Myoporum acuminatum* occur almost at the water's edge. A clump of the Tongue Orchid (*Dendrobium linguaforme*) was noticed on one of the *Hibiscus* trees.

Vine Scrub.—What is known as "scrub" in Queensland is, in correct botanical terminology, rain forest. It has been designated vine scrub on account of the abundant presence of large vines (lianes). A patch of typical coastal scrub showed the principal trees to be:—*Eugenia Smithii* and *E. cyanocarpa*, *Evodia accedens*, *Timonius Rumphii*, *Macaranga Tanarius*, *Ficus stenocarpa*, and *Elæocarpus obovata* (?). The principal lianes were *Mucuna gigantea* and *Vitis sterculiifolia*: smaller vines were *Stephania*



Portion of the Easter Camping Party.

(From a Photo by Miss H. D. Clark.)

hernandiacfolia (Tape Vine) and *Vigna luteola*. Several plants of the shrub *Hibiscus rhodopetalus* were observed. The mistletoe, *Loranthus dictyophlebus*, was found infesting various species of trees. The ground orchid, *Calanthe veratrifolia*, was fairly abundant.

Fresh water Swamps and Turf Moss-formation.—The principal swamp trees were *Casuarina glauca* (Swamp Oak), *Melaleuca leucadendron* (Broad-leaved Tea-Tree), and *Eucalyptus robusta*. Principal shrubs:—*Agonis scortechiniana*, *Leptospermum Liversidgii*, *Epacris microphylla* (in full flower), *Hibiscus diversifolius*, *Melastoma malabathricum*, and *Callistemon pachyphyllus*. The Ground Orchid, *Phaius grandifolius*, was abundant. *Xanthorrhæa macronema* and *Xanthorrhæa hastilis* both occurred. Ferns

common in the swamps were *Blechnum serrulatum*, *Acrostichum aureum* (near the sea), *Todea barbara* (Swamp Tree-Fern), *Pteris incisa*, *Gleichenia* (three species), *Lygodium scandens*. Quantities of *Lycopodium laterale* and *Lycopodium Drummondii* were observed in a turf moss swamp near the Blue Lake. *Lycopodium cernuum* also occurs on the island, but was not collected. *Selaginella uliginosa* was noticed abundantly in most of the swamps.

Open Sandy Forest Land.—The principal trees were:—*Eucalyptus resinifera* (Red Stringy-bark), *E. Planchoniana* (Large-fruited Stringy-bark), *E. hæmastoma* (White or Scribbly Gum), *E. pilularis* (Blackbutt), *E. corymbosa* (Bloodwood), and in damper spots the Blue Gum (*E. tereticornis*) and a few trees of *E. Kirtoniana* (syn. *E. patentinervis*), *Tristania conferta* (Broad-leaved Box), *Angophora lanceolata* (Rusty Gum), *Casuarina torulosa* and *C. suberosa*, *Banksia integrifolia*, *B. æmula* (Honey-suckle), *Persoonia media* and *P. virgata* (Geebung), *Callitris columellaris* and *C. eupressiformis* (Cypress Pines), *Dodonæa viscosa* and *D. triquetra* (Hop Bushes), *Acacia Cunninghamii*, *Glochidion Ferdinandi*, and *Monotoca elliptica*.

Among the shrubs noticed was *Podocarpus spinulosa*—a most interesting find. This conifer apparently had not previously been found much north of Sydney. It is a new record for Queensland, and was found among the stunted eucalypt vegetation referred to in the previous report. Other shrubs included *Strangæa linearis*, *Ricinocarpus pini-folius* (Wedding Bush), *Elaocarpus cyaneus* (bearing numbers of blue fruit), *Bæckea stenophylla* (?) and *B. crenulata*, *Homoranthus virgatus*, *Acacia juniperina*, *Leucopogon lanceolatus*, var. *gracilis*, *Lysinema pungens*, *Epacris pulchella* (the first three in full flower), and other *Epacridæ*, *Petrophila sessilis*, and in wetter places *P. Shirleyæ*, *Olar retusa*, and *Wickstræmia indica*.

Two species of *Xanthorrhæa* occur, *X. media* and *X. quadrangulata* (?). Trees were found commonly attacked by two species of *Loranthus* (Mistletoe)—viz., *L. pendulus* and *L. congener*—the first on Eucalypts only, and the latter on a variety of trees (*Acacia*, *Banksia*, *Casuarina*, &c.).

The peculiar fern, *Shizæa dichotoma*, was fairly abundant in the forest country, and the common Bracken (*Pteridium aquilinum*) was everywhere.

Ground orchids occurring in the forest country and collected in flower were *Geodorum pictum* and *Dipodium punctatum*. The climbing orchid (*Galeola cassythoides*) was collected, but not in flower.

INSECTS OF THE ISLAND.

By R. ILLIDGE.

Our visit to Stradbroke Island took place, in so far as entomology was concerned, at an unseasonable time: hence, few insects were in evidence. We have, however, on previous visits during the early spring seen the place close to our late camp alive with butterflies and moths, also beetles of many kinds.

It is rich in fine Hymenoptera (Thynnidae, with apterous females, are numerous in species), Diptera, Neuroptera, &c. All these have species which are almost peculiar to it, and are not found round Brisbane. Amongst these are two butterflies of much interest, as they are at present only known elsewhere from the neighbourhood of Duaringa, west of Rockhampton. These are known to science under the names of *Nesalycaena albosericea* and *Ogyris Barnardi*, both described by the late W. H. Miskin, and the latter in honour of the late Mr. Barnard, of Coomooloolaroo, a pioneer naturalist of Australia, and revered by all students of our fauna.

Of the butterflies which were observed the most notable was *Troides richmondia*; but, this having been on the wing for some days, specimens were not in good condition.

In Coleoptera, specimens of *Diaderus erythrurus* were taken on a fallen *Callitris*. These were accompanied by a species of *Evania* (?) (Hymenoptera), probably parasitic on its larva. The beetle is interesting as affecting this beautiful tree throughout East Australia, but does not seem to damage the healthy plant, for only unsound or diseased trees are attacked. Timber-getters often unwittingly cause trouble when they cut out pieces of bark and wood to obtain samples of the timber, as this immediately gives wood-boring insects a suitable opportunity for depositing ova.

In addition to the *Diaderus erythrurus*, two or three interesting longicornes, a weevil, *Esiotis leucurus*, and many other small beetles affect both decaying trunk and bark. A clerid beetle, allied to *Omadius*, was also alighting on the fallen trunks, but was so active, and in colour so much like the bark, that only one specimen was secured. Cleridæ appear to be, so far as is known to us, predaceous both in larva and imago. Many species are found on flowers, which they seem to frequent for the purpose of preying on minute insects.

SOME STRADBROKE BIRDS.

By A. H. CHISHOLM, State Secretary, R.A.O.U.

So far as I am aware, Stradbroke Island has not been at all well "worked" from an ornithological standpoint. Various bird-men have been on the island from time to time, but these visits have been only of a spasmodic nature, as, for instance, was that of the members of the Royal Australasian Ornithologists' Union in the spring of 1919.

Something of the same consideration applies in respect of the birds themselves. Apparently, a good number of species visit the island at suitable periods, but none of these stays for any extent of time; and the total list of permanent bird-dwellers would not be lengthy. It is not that the distance across from the mainland offers any obstacle; the point is that the island is so sandy, and the resultant vegetation so limited in variety, that it offers appeal to only a limited variety of birds.

For all that, Stradbroke contains many species of interest, and it would not be surprising to find that several of these show sufficient insular variations to warrant them being elevated to sub-specific rank.*

A rough census taken on the occasion of the Easter expedition of the Field Naturalists' Club gave a total of slightly over forty species for the region adjacent Myora and Dunwich. This would be considerably added to at a more suitable period of the year for sea-birds, but it is doubtful whether a complete list of Stradbroke birds, covering all seasons, would give more than about eighty species.

Sea-birds were not numerous on the occasion of our last visit. A couple of species of the ubiquitous Cormorants fished in the bay, a lone Pelican basked on a sandbank, odd Terns flew past, and we saw also a few Sea-Curlews and one or two of the big White-bellied Sea Eagles. The last-named species breeds on the island; there is a fine eyrie in a tree at the south end. Other water-lovers listed were a Bittern, a solitary White-necked Heron, a small flock of White Ibis—this bird is much fonder of salt water than is its commoner relative, the Straw-necked species—and a small company of Black-throated Grebes. These "Divers" were noted on one of the lonely lakes toward the interior of the island. They are large sheets of water, but purely sand-fed, and carry very little food for birds.

* Stradbroke Island is now a sanctuary.

Pigeons are not common on Stradbroke, the small area of "scrub" being insufficient for their needs. The Little Green Pigeon was reported to have been heard, and it was surprising to hear from two members of the party that they flushed a Wonga at close range in the Myora scrub. One would hardly have expected this ground-frequenting Pigeon to be on the island. Doves are more plentiful, in numbers if not variety. The Barred-shouldered species is common along all the mangrove flats, just as it is on the islands near the south of Stradbroke, and about the neighbourhood of Southport. It is frequently known as the Mangrove Dove. The ground-loving Peaceful Dove



The Peaceful Dove (*Geopelia tranquilla*) and Marjorie.

(From a Photo by A. H. Chisholm.)

was also well-represented. At one of the Dunwich camps an inmate persuaded a pair to occupy an old Dove's nest which he adjusted in grape-vines at the entrance to his tent. There were eggs in the nest at Easter, and it was possible to stroke the sitting bird. (See illustration.)

Quail we did not expect to see, but several members of the party reported a covey of Brown Quail on one of the ridges near Myora. Another grass-lover noted was the small Pipil (*Anthus*), and yet another was an unidentified Finch. (Last year I was surprised to note a pair of the pretty English Goldfinches flying about near Dunwich.)

Birds of prey are scarce upon the island. Odd Wedge-tailed Eagles were seen flying over the high, dry sand-ridges in the interior, a solitary Boobook Owl was heard calling at night, and the Butcher-Birds (if they may be included in this category) were represented by a few of the Grey species. Possibly the handsome Black-throated Butcher-Bird visits the island. Mr. Henry Tryon and I were very interested, a few years ago, in a Butcher-Bird on Bribie Island. It appeared to be a cross between the Grey and Black-throated species, and is probably identical with the old *Cracticus robusta*, now sunk. This point requires attention; *C. robusta* is probably a good subspecies.

There are at least four species of Kingfishers on Stradbroke, namely, the hearty Kookaburra, the sub-tropical Mangrove Kingfisher (*H. sordidus*), the common little Sacred Kingfisher, and the beautiful Creek Kingfisher (*Alcyon*). It was a surprise to record the Creek (blue) species, one of which radiant birds flitted along the brook leading from the remote Blue Lake to the main beach.

Several of the migratory (or nomadic) Cuckoos probably visit Stradbroke at odd times, but the only Cuckoo seen upon this occasion was the big Swamp-Pheasant, the one Australian Cuckoo which builds a nest of its own. It is probably a permanent dweller on the island. I flushed a pair at the south end of the island last spring, and they both "swarmed"—half-flying, half-leaping—up to the tops of bushy trees, where they hid amid the leaves.

Coming to the Passerine birds, the cheery little Welcome Swallows were as common as usual—for they may be observed all the year round in South Queensland—and there were also a fair number of Tree Martins or Fairy Martins.

Flycatchers are varied on Stradbroke, though it is one of the few places where no Jacky Winters (Brown Flycatchers) are to be seen. The White-throated and Singing Flycatchers (*Gerygone*) are there, the first rare and the second fairly common in the mangroves. The pretty "Yellow-Bob" (Yellow-rumped Shrike-robin) may be found at both ends of the island, but in no area is it numerous. Rank this fraternal species as one of the "permanents." On this last occasion we listed also the Rufous-breasted Whistler of the ringing whistle, one solitary but quite cheery White-shafted Fantail ("Cranky Fan"), several of the irrepressible Wagtails, and a fair number of Leaden Flycatchers. The last-named pretty species seems to be permanent on the island. The Rufous Fantail, Satin Flycatcher, and, probably, the Black-faced

Flycatcher are visitors to the island which we did not see recently.

Odd Black-faced Cuckoo-Shrikes ("Blue Jays") were noted not far from Myora, and in the same locality we again saw several Pied Caterpillar-eaters. The latter handsome bird is one of the "permanents," and its queer "Kar-r-r" can usually be heard about the semi-scrub near the coast. It is a larger bird than the White-shouldered Caterpillar-eater (a visitor to the island), but has none of the small relative's merry voice. We did not see any Wrens, but on an earlier occasion (last spring) a *Malurus* suggesting the somewhat rare *M. cyanocephalus* was seen at the south end of the island. A few Grass-Warblers (*Cisticola*) inhabit the same swampy areas.

Quite a small contingent of the graceful White-rumped Wood-Swallows frequently flew about our camp. No other *Artamus* has such a predilection for coastal areas. Another weakness of the White-rump is to take possession of old nests of the Mud-lark (*Grallina*). We saw no less than five of these birds clamouring over such a nest, placed high in a eucalypt. Three of the birds were inside and two outside, and the whole purport of the discussion appeared to be regrets that the discovery had been made at the wrong time of the year. All five Wood-Swallows flew away subsequently.

A solitary Tree-Creeper (*Climacterus*) noted far inland is probably the first record of this genus for the island. Previously it had appeared that this bird's place was taken by the sweet-voiced Rufous Thrush, which often climbs trees after the manner of the Tree-Creepers. We saw no Rufous Thrush this time, however; only a few of the common Grey Thrushes were noted. Another interesting solitary individual was the handsome fish-tailed Drongo.

Passing by the Mistletoe-Bird (*Dieacum*), which breeds on the island, and one or two other common species, we come to those typical, merry Australians, the Honeyeaters. Including three species of Honey-Parrots, at least ten species of these birds came under notice. Some, indeed, forced themselves under notice by their sustained shouts and chuckles. There seemed to be something of a noise-competition in progress between the large Leather-head (*Tropidorhynchus*) and the small *Stigmatops*. Commensurate with its size, this little Brown Honey-eater has one of the biggest of bird-voices. Among the other nectar-lovers were the dainty Scarlet Honeyeater (*Myzomela*), a *Melithreptus*, *Ptilotis chrysops*, the White-checked Honeyeater (*Meliornis sericea*)—which pretty study in black, white, and gold seems to differ in voice

from the mainland bird, and which is common and shy among the grass-tree areas inland—the Brush Wattle, and the Little, Blue, and Green (Scaly-breasted) Lorikeets.

These Honey Parrots were numerous. Usually they are only seen in such numbers during the summer, and their autumnal "rallies" have revived a belief, once current among the blacks, that "big fellow" mobs of these Parrots are always followed by "big fellow" lots of mullet fish along the coast. Mr. Thomas Welsby, who has had long experience of Stradbroke Island, shares this belief, and an effort is being made at present to discover a reason for the queer affinity between bird and fish.

TRANSACTIONS.

FROG-EATING CARABS—*Catadromus lacordairei*.

By Mrs. M. I. HOBLER, Jandowae.

The following incidents may interest many of the members of the Field Naturalists' Club, as so far I have not been able to hear of any one else who has found these earabs (*Catadromus lacordairei*) actually devouring frogs of an ordinary size.

We found the first victim a good few years ago, when, one evening, our attention was drawn by the continual croak of a frog in pain. Thinking a snake was probably the trouble, we provided ourselves with a stick and lantern; then, under a petunia bush, the frog was quickly located. Fastened to its side was a splendid specimen of *C. lacordairei*, which the poor frog, with vain leaps and rolls on the ground, was trying to dislodge.

I captured this carab, but it took a good pull to make it let go its victim. Later on, we found another frog under much the same circumstances.

We did not hear any others until February of last year, when one evening, after several days of heavy rain, we again heard the distressed croak of a frog. (Perhaps it would be as well to mention here that to the bushman, woman, or child this alarm cry signals "snake," and a search is generally made at once—indeed, the frogs were the means of us finding more than one black snake on our veranda this summer.) On that evening we had a visitor, and, the garden being muddy, no move was made for a hunt; but later we found the frog, which was carried into the room and put on the table.

Above its hip—if that part of a frog's anatomy can be so styled—a carab was fastened, and it continued greedily eating its way into the body of its victim. For absolute brutality one can see nothing worse than Nature's own workings. From the foot of that unfortunate frog right up to the carab's position every bit of flesh was stripped, leaving only the bone and a bit of skin. The wretched creature was in a state of collapse and only able to emit faint croaks of pain.

"The poor devil is suffering Hades!" exclaimed our visitor, a soldier back from the horrors of war. I secured the carab, and the frog was dispatched to end its misery.

Next evening came the now well-known croak; so, with a growl at beetles in general, Man with lantern and stick soon located the trouble. A brown frog was tossing itself about in agony, while fastened in its stomach were the deadly nippers of *C. lacordairei*. We released the victim, but the carab was damaged and useless as a specimen.

I may add these incidents have only occurred here after heavy rain and when there is extra shelter in the garden.

THE FLORA OF A SMALL TROPICAL ISLAND.

By the late W. BRADTKE.

(With a foreword by C. T. White, F.L.S.)

During the years 1916 to 1918, Mr. W. Bradtke, a resident of the Duke of York Islands, Bismarck Archipelago, New Guinea, and a keen collector of the native flora of the group, sent me a number of botanical specimens, and it was our intention in conjunction to work up the flora of the Duke of York Islands in detail. This proposal was cut short by Mr. Bradtke's untimely death on 10th May, 1919.

Among his correspondence to me was the following account of the flora of a small coral island near his home, and it is now offered for publication. A noteworthy feature is the record of native names. In the list given herewith the native name in the Duke of York group follows the botanical one in each case.

All the species listed, with the exception of the *Crinum*, and possibly the *Carapa*, occur on the sea coast of tropical Queensland. Practically all are plants noted for the buoyancy of their seeds, these being carried considerable distances by ocean currents.—C.T.W.

About 600 yards due north of the north-east corner of Kakabon Island is a narrow sandbank known to the natives by the name of "Unurum," on a large foundation of coral. This sand accumulation has been there for the last thirty years, and varies slightly in size and shape according to the wind and sea. In 1911 nine cocoanut palms were planted on the place, but in the meantime (October, 1917) eight have died, and the last one does not look well. I am giving hereunder a list of the vegetation of Unurum, which may be of interest, giving an idea as to the plants which early start to get a footing on a tropical coral island.

Apart from the cocoanut (*Cocos nucifera*), native name "Lama," there are twenty-two species on the island, which has a total area, including the sandbank, of $1\frac{1}{2}$ acres; the area carrying growing land plants is, however, only two-fifths of an acre. The species belong to sixteen families or orders, and are as follows:—

1. Guttiferae: *Calophyllum inophyllum*; "Manumba."
2. Malvaceae: *Hibiscus tiliaceus*; "Vavar," Cotton Tree
or Coast Hibiscus.
,, *Thespesia populnea*; "Banar."
3. Meliaceae: *Carapa* sp. (fruit somewhat smaller than *C. moluccana*); "Valare," Apple Mangrove.
4. Rhamnaceae: *Colubrina asiatica*; "Uraien."
5. Sapindaceae: *Dodonaea viscosa*; "Nuk," Hop Bush.
6. Leguminosae: *Caesalpinia Bonducella*; "Bet."
7. Ficoideae: *Sesuvium portulacastrum*; "Protol."
8. Goodenoviaceae: *Scacvola Keonigii*; "Tongtongolop."
9. Boraginaceae: *Tournefortia argentea*; "Ununur."
,, *Cordia subcordata*; "Kana."
10. Verbenaceae: *Premna integrifolia*; "Kua."
11. Lauraceae: *Cassytha filiformis*; "Aru pata kambina,"
Dodder Laurel.
,, *Hernandia peltata*; "Palubir."
12. Euphorbiaceae: *Euphorbia pilulifera*; "Tortorok
damin," Asthma Weed.
,, *Euphorbia atoto*; "Tortorok damin."
13. Casuarineae: *Casuarina equisetifolia*; "Iar," Coast
She-Oak.
14. Amaryllidaceae: *Crinum macrantherum*; "Kare."
15. Pandanaceae: *Pandanus odoratissimus*; "Marita,"
Screw Palm.

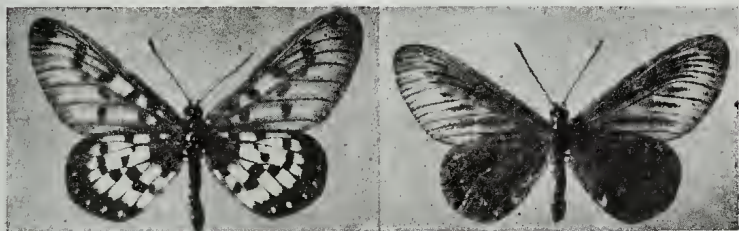
16. Gramineæ: *Eleusine indica*; "Valir takina boro," Crow-foot Grass.

„ *Lepturus repens*; "Valir" (Valir is the general name for grass).

A BUTTERFLY-OF MELANIC FORM.

By P. FRANZEN.

Butterflies of a melanic form are by no means common, and when my son, some time back, had the good fortune to capture one, I was naturally very pleased.



Acraca andromacha; typical and melanic forms.

(From a Photo. by H. Hacker.)

The specimen here referred to belongs to the genus *Acraca*, of which we have but one representative in Australia—namely, *Acraca andromacha* (Fab.).

To be able more clearly to demonstrate the difference in the melanic and typical form of this butterfly, I have with this note supplied a photograph of each.

From the photos it will be seen that the melanic form is entirely devoid of typical markings, which gives the butterfly a very black appearance when compared with an ordinary specimen.

Forewings—Semitransparent; each wing with six black opaque stripes parallel to the veins and extending more than half across discal area.

Hindwings—Entirely black; opaque; with an obscure light mark on dorsum.

SPECIAL ACKNOWLEDGMENT.

The club is again indebted to the Honorary Secretary (Mr. J. C. Smith) for the blocks which illustrate this issue.

SYLLABUS: MAY-JUNE.

April 30-May 2: Excursion to Spring Bluff, Main Range.

May 15: Reports on Excursions.

May 22: National Park Lectures, School of Arts Hall.

June 3: Excursion to Jones's Apiary and Woogaroo Scrub.

June 19: Lecture by Miss Freda Bage, M.Sc. Subject: A Trip to Tasmania, with special reference to the recently-proclaimed Tasmanian National Park, of 68,000 acres.

Professor T. Harvey Johnston, from whom it was hoped to have a lecture in May, will not be available until later in the year.

EXCHANGING.

Mr. W. H. Weeks, 568 Willoughby avenue, Brooklyn, New York (U.S.A.), desires to correspond with members willing to exchange shells. He has a large list of duplicates, in good order, with beetens as specialties.

Mr. John Wallace, Y.M.C.A., Hamilton, Ontario (Canada), would be glad to exchange fossils or geological specimens with Queensland collectors. Mr. Wallace also forwards a paper on the geology of the Hamilton District.

Mr. Hugo H. Schroder, 303 E. State st., Bettendorf, Iowa (U.S.A.), is desirous of exchanging nature photographs and lantern slides. He is especially interested in photography of wild birds.

END OF VOL. II.
